State of Arkansas

2004 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

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ARKANSAS
Department of Environmental Quality

This book is maintained by:
Arkansas Department of Environmental Quality
Water Division
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Federal Water Pollution Control Act

Water Division Chief: Martin Maner, P.E.
Street Address: #1 State Police Plaza Drive, Little Rock, AR 72209
Mailing Address: P.O. Box 8913, Little Rock, AR 72219-8913
ADEQ Helpline: (501) 682-0923

http://www.adeq.state.ar.us/water

Cover Photo: Falling Water Falls on Falling Water Creek in Pope County, AR

STATE OF ARKANSAS

DEPARTMENT
OF
ENVIRONMENTAL QUALITY

INTEGRATED WATER QUALITY MONITORING
AND ASSESSMENT REPORT
2004

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WQ05-07-01

Water Division Planning Branch

Mr. Martin Maner, P.E. is currently the Chief and Mr. Steve Drown 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 Ambient 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 "Water Quality Inventory 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 Biomonitoring Program. Ground-water issues of concern in recent years have included the investigation of pesticides in ground water, potential impacts from confined animal operations, and saltwater intrusion in southeastern Arkansas. Various staff members represent the Department on numerous Federal, State, local, and watershed-based advisory boards and technical support groups.

Current staff includes:

Martin Maner, P.E., Chief, Water Division
Steve Drown, Assistant Chief, Water Division
Bob Singleton, Technical Assistance Manager
Jim Wise, Program Support Manager
Sarah Clem, Water Quality Resources Specialist
Erica Shelby, Water Quality Resources Specialist
Mary Scott, Program Coordination Section Manager
Jill Glenn, Ecologist II
Sam Lackey, Ecologist II
Tim Kresse, Professional Geologist
John Fazio, Senior Geologist
Ellen McNulty, Program Support Manager
Philip Osborne, Program Coordinator
Rob Beadel, Ecologist II

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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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 impaired waters on which TMDLs (total maximum daily loads) or other corrective actions must be determined. Current EPA guidance recommends the States produce an integrated report combining the requirements of the Act for Section 305(b) reporting and 303(d) submissions. The combined report is referred to as the *Integrated Water Quality Monitoring and Assessment Report.* The 2004 version of this report uses the 1996 - 305(b) Guidance Document from EPA which is supplemented by a Memorandum from the Director of EPA's Office of Wetlands, Oceans and Watersheds, subject "Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(b) of the Clean Water Act; TMDL-01-03". The reporting period for Arkansas' 2004 report is from October 1998 to September 2003.

The use of River Reach File 3 (RF3) by the EPA 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 waterbody (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 90,000 miles (RF3). However, since the RF3 database includes many waters with only ephemeral flows and very short- term uses, we have chosen to retain the RF1 data as the base delineation and tabulation of Arkansas' waters.

Specific guidance was developed by EPA 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 EPA 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 142 stations monitored monthly for several key water quality parameters. In addition, 171 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 21 sites in the Strawberry River basin. 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 which were sampled seasonally for fecal coliform and *E. coli* bacteria.

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' waters:

Total miles of streams in RF1	12,071.7
Total miles of streams in RF3	87,617.4
Miles assessed for use attainment	9,305.7
miles monitored	6,620.9
miles evaluated	2,684.8
Miles meeting all assessed uses	7,673.7
Assessed miles not meeting fishable goal	1130.7
Assessed miles not meeting swimmable goal	121.5

This data indicates that 82.5 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, EPA 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 by not limited to Section 404, which may result in any discharge 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 10 years. The Arkansas Ambient Ground-Water Quality Monitoring Program currently maintains approximately 280 monitoring sites across the State, which since inception of the program had been sampled every three years. 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 our knowledge of baseline ground-water chemistry of the numerous aquifers of 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 currently is developing a ground-water monitoring area spanning several counties in the 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 impact of pesticide use in the Delta, impact of confined animal operations in northwest Arkansas, and areas of saltwater intrusion in southeast Arkansas.

The increasing focus on ground water quality in recent years 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 U of A Cooperative Extension Agency and the Natural Resources Conservation Service, among others. In addition to water quality concerns, declining ground water levels prompted the Arkansas Soil and Water Conservation 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 EPA guidance, which enacted many changes primarily related to consistency among States.

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

The initial Nonpoint Source Pollution Assessment for Arkansas was prepared using pre-1988 data. An assessment update was completed in 1990 and again in 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, not solely from agriculture activities. 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, road construction and maintenance, and urban activities. 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 have begun to address many of these issues.

The classification of the State's waters by ecoregions not only categorize them by physical, chemical and biological features, but separates 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 agriculturalized 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 impair 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. Many of the waterways within the Delta Region do not consistently maintain the swimmable criteria set forth in the Arkansas water quality standards even though the contaminants are not from human fecal sources. The standard in effect during this assessment period was based on the fecal coliform test which supposedly indicates the amount of fecal contamination within the water. However, this test also reads positive for numerous soil bacteria which bear no relationship to fecal contamination. Future evaluations will be based on *Escherichia coli*, a more accurate indicator of contamination by warm-blooded animals.

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, from storage and transmission of the product and from 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 which 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 impairments to the streams within this region. Occasional above normal turbidity values have been observed during periods of significant rainfall events. Potential impairments 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 from within this region tend to introduce contaminants from the predominantly agricultural land use, which are primarily pasture lands 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 will provide a more accurate measurement of contamination from warm-blooded animals. 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 easily go into colloidal suspension, thus causing long-lasting, high turbidity values.

The Boston Mountains Region, located in north central Arkansas, is a sparsely populated area. The dominant land use is silviculture and much of the region is located within the Ozark National Forest. It is a high recreational use region with exceptionally high quality water. 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 from within this region are designated as extraordinary resource waters. The fractured limestone and dolomite lithology of the region allows a direct linkage from surface waters to ground waters. The water quality problems within this region are directly related to land use. The large human population increase in this area 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. The waste generated from these animal production facilities is generally land applied and, therefore, has the potential for contaminating both surface and ground waters, prompting the recent enactment of legislation to control the quantity and rates of application of dry litter in the identified Nutrient Surplus counties of the State. The nutrient levels measured from this region are atypically high and are trending upward. 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.

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PART II	BACKGROUND
CHAPTER ONE	ATLAS OF ARKANSAS

There are approximately 34 million acres of land and water inside Arkansas' 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 pasture land 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 is 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 EPA River Reach File (RF1) with some additions by the Department. The RF1 files were digitized from 1:500,000 scale maps and includes only the major water bodies. Recently the EPA 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.

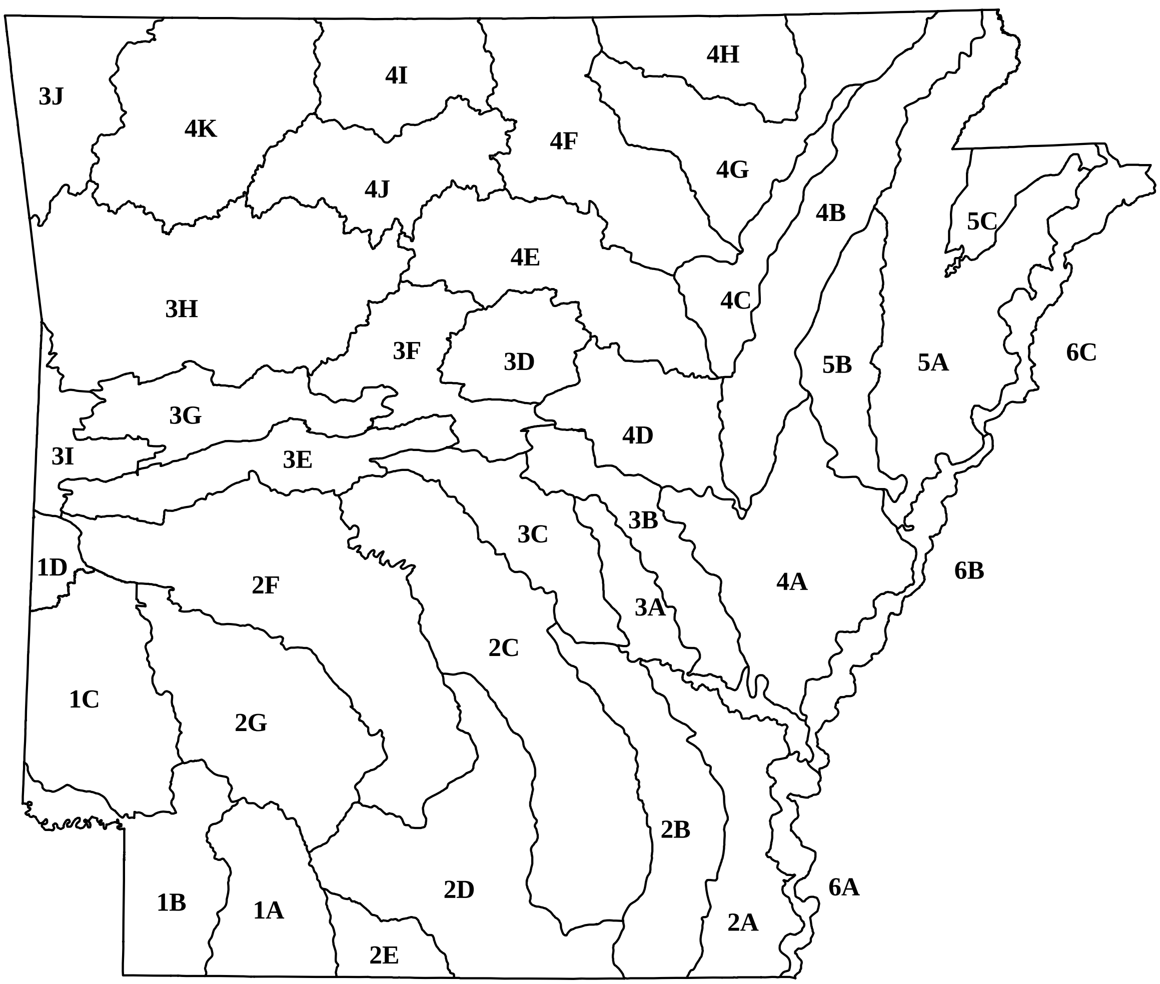
For comparison, the following data was developed from the EPA RF3/DLG database for the State of Arkansas:

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 six 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 *II-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' publicly owned lakes and reservoirs and their trophic status. The State has a total of 356,254 acres of significant publicly-owned lakes. The EPA 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 States' 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 1960's 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 the Arkansas' Delta Region would continue to lose wetlands at a rate of over 15,000 acres per year. Additional discussion about the States' 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' streams are classified as high quality, outstanding state or national resources. The designated uses assigned to various water bodies include:

- Extraordinary Resource Waters
- 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

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CHAPTER TWO WATER POLLUTION CONTROL PROGRAMS

Watershed Approach

The watershed approach for water quality management in Arkansas was initiated in the early to mid 1970's 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 EPA's River Reach File. This allows GIS capabilities to assist with designation, characterization, assessment and management.

Water Quality Standards

Arkansas' water quality standards are based on extensive data collection of the physical, chemical, and biological characteristics of least-disturbed streams within ecoregions which 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 which 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.

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 EPA 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 development. 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, food processing plants and salt water disposal systems. In addition, the State Permits Branch manages the Underground Injection Control (UIC) Program and is responsible for 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 EPA 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' major and selected minor NPDES permits is illustrated in Figure II-2.

Storm Water Requirements

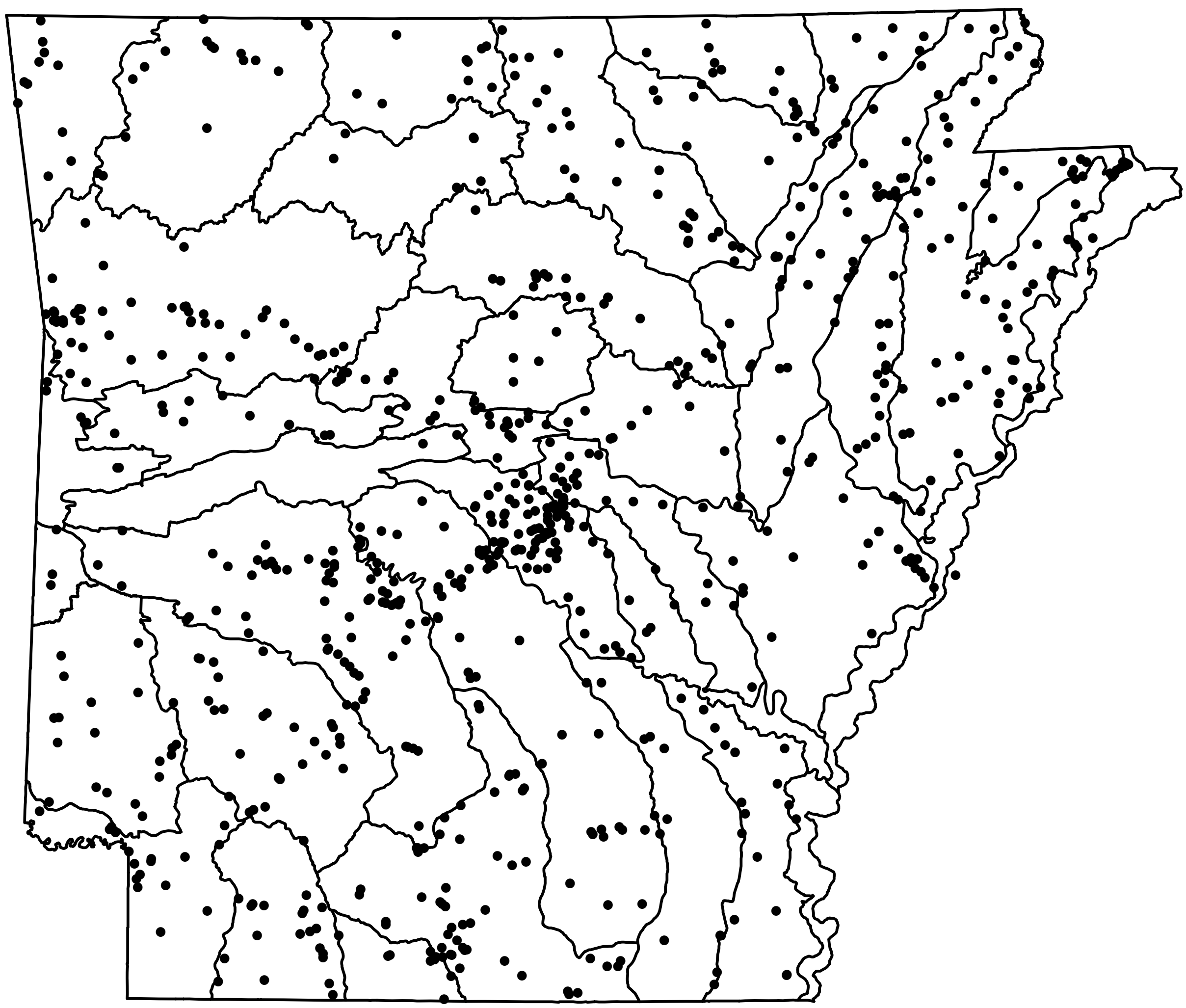
The Storm Water Section (SWS) of the NPDES Branch was created to help reduce the pollutant loadings on streams from storm runoff from industrial areas. The SWS has approximately 1618 general storm water runoff permits for industrial activity (ARR00A000) and approximately 551 general storm water runoff permits for construction activity (ARR10A000). Twelve groups of industry have to monitor storm water runoff annually per the general permit (ARR00A000). Five hundred and four of the industrial permittees monitor their runoff annually. Additionally, there is a separate municipal storm sewer system (MS4) permit (ARS000001). This permit has been issued as a co-permit to the City of Little Rock, the Arkansas State Highway and Transportation Department (AHTD), and other applicable entities throughout the State.

The general storm water permits require facilities to develop a Storm Water Pollution Prevention Plan (SWPPP) using Best Management Practices (BMPs). These BMPs should address 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.

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 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).

Figure II-2: NPDES Permitted Facilities



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 which:

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 permittee and compliance monitoring conducted by the State. The State has been and will continue to implement the post-third round permit policy endorsed by EPA Region 6, with minor revisions. Whole effluent toxicity testing requirements are included in all major and selected minor permits. Biomonitoring 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, EPA promulgated numeric criteria for 10 heavy metals and cyanide into Arkansas water quality standards. These criteria were initially expressed as total recoverable metals. Later EPA 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 EPA as a part of the States' 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 biomonitoring is required.

Self Monitoring for Toxicity

Biomonitoring was required in 62 major and significant minor industrial NPDES permits. Toxicity was indicated in 17% of 949 toxicity tests submitted by these permittees. Four industrial facilities are performing, or have completed, Toxicity Reduction Evaluations (TRE's) from January 2001 – December 2003. Depending on the results of the TRE's, these facilities have discontinued or relocated discharges or improved treatment capabilities.

Sixty-eight municipal permittees reported results of approximately 961 toxicity tests performed in this time span. Seven percent (7%) of these analyses exhibited toxicity.

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 biomonitoring requirements were not continued. The facilities that were still having trouble passing the biomonitoring 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 biomonitoring. From October 1, 1998 to December 31, 2001, permits expired or biomonitoring was no longer required for several facilities leaving 5 facilities still sampling. Currently, those same 5 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 2003, 85 environmental testing laboratories have received certification from the State of Arkansas.

Enforcement

Enforcement responsibilities for the NPDES permits are divided between EPA Region 6 and the NPDES enforcement section. Those facilities subject to ongoing enforcement actions by EPA at the time of program authorization remain the responsibility of EPA 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). 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. There are approximately

3000 licensed operators in Arkansas, which includes both municipal and industrial operators. Classification of wastewater treatment plants by population served and 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 Soil and Water Conservation Commission (ASWCC). The program is now part of the Water Development Division, Water Resources Cost Share Revolving Fund at ASWCC. 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, the Department 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 EPA Region 6 nonpoint source program personnel.

In 1996, the Arkansas Soil and Water Conservation Commission (ASWCC) 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 the Department has retained the responsibility of preparing and updating the Nonpoint Source Assessment report, watershed prioritization, and the responsibilities associated with the Construction, Resource Extraction (mining), Land Disposal, Recreation, Other, and Unknown categories. The Department and the Municipal League share responsibilities for the Urban Runoff category, and the Department and the ASWCC share responsibilities for the Hydrologic/Habitat Modification category.

Assessment

The initial Arkansas Nonpoint Source Pollution Assessment, 1988, assessed approximately 36 % of the 11,300 stream miles in the State. Based on assessment criteria established in 1988, 58 % of the assessed streams were not meeting all designated uses. Limited data for the 79 significant publicly owned lakes indicated no use impairment by nonpoint sources. There was also inadequate data to identify specific areas of groundwater impairment. The 1988 assessment identified agriculture and mining as the primary categories of nonpoint source (NPS) pollution causing impairments to water bodies of 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, beginning in 2004, the Department will no longer publish a separate nonpoint source assessment report. This document and any future updates will serve as the nonpoint source assessment report.

Management Program

The Arkansas Nonpoint Source Pollution Management Plan was updated and fully approved in 1999. It provides for continued monitoring of water quality, research into the effectiveness of Best Management Practices (BMPs), and implementation strategies of BMPs. Currently, the ASWCC is updating the Management Plan. It will cover a five year time period (2005 – 2010).

Current Activities

In 1997, ASWCC initiated a Priority Watershed Program that targets NPS impacted watersheds for BMP implementation. A multi-agency task force prioritizes watersheds using many parameters, including the degree of impairment, State importance, and public participation. Ten watersheds were selected in 1997 for either more intensive survey activities or BMP implementation activities. Since that time, two revisions have been made to the priority watershed list. A copy of Arkansas Nonpoint Source Pollution Management Program, Priority Watershed Program can be obtained by contacting the Arkansas Soil and Water Conservation Commission.

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% to 40% 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% to 37% was needed in order for the waterbody to meet in-stream turbidity water quality standards.

The Department 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 is to be completed in early 2006.

CHAPTER THREE 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. Promulgation of ground water standards which reflect existing water quality in different aquifers and different regions of the State similar to the ecoregion approach to the protection of surface waters should be developed.

2. Development of a statewide ground water quality database and/or more effective data management to improve access across programs by other agencies and the private sector.

3. More effective methods are needed to identify NPS 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. Formation of local watershed groups in water bodies listed as impaired will be critical in getting local "buy-in" to address the sources of impairment.

5. 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 and runoff from urban construction sites. Current programs include the EPA Stormwater 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 Soil and Water Conservation Commission.

6. Development of a process to establish watershed-specific goals for nutrients. The Department is currently developing a strategy to develop criteria and standards to address nutrient impacts to the State's waterbodies. The strategy will first focus on the States' water supply reservoirs and those waterbodies of outstanding ecological or economical value.

7. Incorporation of a multi-discipline approach to pollution control to include the interrelationships of air, water, solid waste, and impacts of the groundwater. This has recently been conceptualized as part of the watershed management approach.

8. Protection of 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. Comprehensive, multi-discipline approach to ground water protection through total agency cooperation in both investigating and preventing ground water contamination.

10. Development of lake management water quality control programs including water quality monitoring, watershed management, and water quality standards specific to individual or similar lake types.

11. Developing information to expand our 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. Implementation and management (educating contractors) of the new storm water regulations which went into effect in November, 2003. The 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 program 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.

In 1994, the waters of the State which 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. Additional sites have been added to each group to bring the total number of stations to 171. These stations are known as the "Roving Monitoring Network". Currently, the northwest portion of the state is being sampled under this program.

Table III-1 lists the stations that are part of the Ambient Water Quality Monitoring Network.

Table III-2 (page 26) lists the Roving Water Quality Monitoring Network stations. Table III-3 (page 32) lists the recent special monitoring projects and their stations and Table III-4 (page 34) lists the historical special projects. Table III-5 (page 34) lists the parameters analyzed. Figure III-1 (page 35) depicts the distribution of the Ambient and Roving monitoring stations and Figure III-2 (page 36) depicts the special project sampling stations.

Table III-1: Ambient Water Quality Monitoring Stations

Red River Basin			
Station No.	**Planning Segment**	**Station Description**	**Flow Gauge**
RED 27	1A	Bodcaw Creek south of Lewisville	*
RED 15A	1A	Dorcheat Bayou east of Taylor	*
RED 45	1B	Red River @ Hwy 82 nr Garland	
RED 46	1B	Red River @ Fulton RR crossing	
RED 04A	1B	Days Creek southeast of Texarkana	*
RED 09	1B	Red River near Doddridge	*
RED 25	1B	Red River south of Foreman	*
RED 05	1B	Sulphur River south of Texarkana	*
RED 33	1C	Bear Creek below Process City	
RED 22	1C	Cossatot River @ Hwy. 24 bridge	*
RED 31	1C	Cossatot River near Wickes at Hwy. 4	
RED 34A	1C	Holly Creek above Dierks	
RED 34B	1C	Holly Creek below Dierks	
RED 02	1C	Little River near Horatio	*
RED 23A	1C	Rolling Fork R. @ County Rd N. of Hwy 24	*
RED 30	1C	Rolling Fork R. above DeQueen Res.	
RED 32	1C	Saline River north of Dierks at Hwy. 4	
RED 21	1C	W. Saline River @ Hwy. 24 bridge	*
RED 18B	1C	Mine Creek @ Hwy 355 S. of Nashville	
RED 48B	1C	Mine Creek @ Hwy 27 Bypass S. of Nashville	
RED 58	1C	Rolling Fork River near Grannis	
RED 01	1D	Mountain Fork near Hatfield	*

Ouachita River Basin			
Station No.	**Planning Segment**	**Station Description**	**Flow Gauge**
OUA 15A	2A	Boeuf River near AR-LA Line	*
OUA 13	2B	Bayou Bartholomew near Jones, LA	*
OUA 33	2B	Bayou Bartholomew near Ladd	*
OUA 18	2C	Big Creek below Sheridan	
OUA 43	2C	Big Creek at Hwy. 35	
OUA 31	2C	Hurricane Creek near Sardis	*
OUA 116	2C	Hurricane Creek @ Hwy. 270 bridge	*
OUA 10A	2C	Saline River near Fountain Hill	*
OUA 26	2C	Saline River near Benton	*

Ouachita River Basin			
Station No.	**Planning Segment**	**Station Description**	**Flow Gauge**
OUA 41	2C	Saline River below Benton (Shaw)	*
OUA 42	2C	Saline River at Hwy. 167 (Sheridan	*
OUA 117	2C	Saline River @ Ozment Bluff	*
OUA 118	2C	Saline River @ Hwy. 79 bridge	*
OUA 05	2D	Bayou L'Outre near Junction City	*
OUA 47	2D	Jug Creek below Fordyce	
OUA 28	2D	Moro Creek east of Hampton	*
OUA 08B	2D	Ouachita River @ Felsenthal Dam	
OUA 37	2D	Ouachita River below Camden	*
OUA 124B	2D	Ouachita River @ Pigeon Hill	
OUA 27	2D	Smackover Creek near Smackover	*
OUA 02	2E	Cornie Bayou near Three Creeks	*
OUA 23	2F	Caddo River near Amity	*
OUA 44T	2F	N.L. Baroid trib to South Fork Caddo	
OUA 06	2F	Ouachita River nr Malvern @ Rock Port	*
OUA 21	2F	Ouachita River near Pencil Bluff	*
OUA 30	2F	Ouachita River near Donaldson	*
OUA 40	2F	Prairie Creek below Mena	
OUA 44	2F	South Fork of Caddo River at Fancy Hill	
OUA 159	2F	Cove Cr. @ Hwy. 51 nr. Magnet Cove	
OUA 22	2G	Little Missouri River near Langley	*
OUA 35	2G	Little Missouri River near Boughton	*
OUA 39B	2G	Little Missouri River below Murfreesboro	*

Arkansas River Basin			
Station No.	**Planning Segment**	**Station Description**	**Flow Gauge**
ARK 20	3A	Arkansas River at Dam #2	*
ARK 60	3B	Bayou Meto at W Main St Bridge, Jacksonville	
ARK 50	3B	Bayou Meto below Jacksonville at Hwy. 161	
ARK 23	3B	Bayou Meto near Bayou Meto	
ARK 97	3B	Bayou Two Prairie S. of Carlisle	
ARK 46	3C	Arkansas River at Lock & Dam #6	*
ARK 48	3C	Arkansas River below Pine Bluff, L&D #4	*
ARK 49	3C	Arkansas River above Pine Bluff, L&D #5	*
ARK 29	3C	Arkansas River at Murray Lock & Dam	

Arkansas River Basin			
Station No.	**Planning Segment**	**Station Description**	**Flow Gauge**
ARK 37	3E	Fourche LaFave River near Gravelly	*
ARK037A	3E	Fourche La Fave River near Harvey	
ARK 52	3E	S. Fourche LaFave River above Hollis	*
ARK 30	3F	Arkansas River at Lock & Dam #8	*
ARK 51	3F	Stone Dam Creek below Conway	
ARK 31	3F	Arkansas River at Lock & Dam #9	*
ARK 32	3F	Arkansas River near Dardanelle	*
ARK 67	3F	Whig Creek below Russellville	
ARK 53	3F	White Oak Creek near Atkins	
ARK 58	3G	Chickalah Creek at Chickalah	*
ARK 57	3G	Dutch Creek below Shark	*
ARK 34	3G	Petit Jean River South of Booneville	*
ARK 44	3H	Illinois Bayou northwest of Dover	*
ARK 33	3H	Arkansas River at Ozark Lock & Dam	*
ARK 38	3H	Arkansas River near Fort Smith, AR	*
ARK 43	3H	Big Piney Creek at Hwy. 164	*
ARK 42	3H	Mulberry River at I-40	*
ARK 11B	3H	Short Mountain Creek below Paris	
ARK0146	3H	Arkansas River below Mayo L&D	
ARK 14	3I	Poteau River near Fort Smith	
ARK 15	3I	James Fork Near Hackett	*
ARK 54	3I	Poteau River above Waldron	*
ARK 55	3I	Poteau River below Waldron	*
ARK 07A	3J	Barren Fork at County Rd 11 near Dutch Mills	*
ARK 10C	3J	Clear Creek below Fayetteville	
ARK 04A	3J	Flint Creek near W. Siloam Springs	*
ARK 06	3J	Illinois River @ Hwy. 59	*
ARK 06A	3J	Illinois River near Siloam Springs	
ARK 40	3J	Illinois River near Savoy, AR	*
ARK 56	3J	Town Branch below Bentonville	
ARK 41	3J	Osage Creek near Elm Springs	*
ARK 05	3J	Sager Creek near Siloam Springs	
ARK 03	3J	Spavinaw Creek north of Cherokee	*
ARK 141	3J	Cincinnati Cr. @ Hwy 244	

White River Basin			
Station No.	**Planning Segment**	**Station Description**	**Flow Gauge**
WHI 74	4A	Boat Gunwale Slash at Hwy 146	
WHI 73	4A	Prairie Cypress Creek at Hwy 1	
WHI 36	4A	White River at St. Charles	*
WHI 26	4B	Bayou DeView west of Gibson	*
WHI 138	4C	White River @ Hwy 67 near Newport	*
WHI 31	4D	White River at DeValls Bluff	*
WHI 72	4D	Wattensaw Bayou north of Hazen	*
WHI 59	4E	Little Red River below Searcy	
WHI 43	4E	Middle Fork Little Red River near Shirley	*
WHI 65	4F	Hicks Creek below Mountain Home	
WHI 11	4F	South Sylamore Cr. below Lick Fork Cr.	
WHI 29	4F	White River at Oil Trough	
WHI 46	4F	White River near Norfork, AR	*
WHI 03	4G	Black River @ Hwy 63, E. Corning	*
WHI 25	4G	Black River at Pocahontas	*
WHI 04	4G	Current River near Pocahontas	*
WHI 24	4G	Strawberry River south of Smithville	*
WHI 05B	4H	Eleven Point River near Pocahontas	*
WHI 89	4H	Mammoth Spring east bridge @ spillway	
WHI 23	4H	South Fork of Spring River near Saddle	*
WHI 06A	4H	Warm Fork Spring River near Thayer, MO	*
WHI 21	4H	Spring River south of Ravenden	*
WHI 22	4H	Spring River @ low water bridge nr Hardy	*
WHI 88	4H	Spring River @ Town Bridge in Hardy	
WHI 48A	4I	Crooked Creek at Hwy 14 near Yellville	*
WHI 48B	4I	Crooked Creek S. of Flippin	
WHI 48C	4I	Crooked Creek at Hwy 101	
WHI 66	4I	Crooked Creek below Harrison	
WHI 67	4I	Crooked Creek above Harrison	
WHI 49A	4J	Buffalo River at Hwy 65 near St. Joe	*
WHI 71	4K	Long Creek below Denver	*
WHI 70	4K	Holman Creek below Huntsville	
WHI 09A	4K	Kings River north of Berryville	*
WHI 123	4K	Kings River NE Alabam	*
WHI 103	4K	Middle Fork White River W. Elkins	*

White River Basin			
Station No.	**Planning Segment**	**Station Description**	**Flow Gauge**
WHI 68	4K	Osage Creek above Berryville	*
WHI 69	4K	Osage Creek below Berryville	
WHI 116	4K	War Eagle Cr. @ Hwy 45, N. Hindsville	*
WHI 51	4K	West Fork White River near Fayetteville	*
WHI 52	4K	White River near Goshen	*
WHI 106	4K	White River @ Durham	

St. Francis River Basin			
Station No.	**Planning Segment**	**Station Description**	**Flow Gauge**
FRA 13	5A	St. Francis River at Hwy. 50	*
FRA 08	5A	St. Francis River @ Hwy 18	*
FRA 10	5B	L'Anguille River near Marianna	*
FRA 12	5B	Second Creek north of Palestine	*

Table III-2: Roving Water Quality Monitoring Stations

Red River Basin		
Station No.	**Planning Segment**	**Station Description**
RED0056	1A	Little Bodcaw Creek at Hwy. 29 near Lewisville
RED0057	1A	Bodcaw Creek at Hwy 355 near Hempstead County Line
UWBCH01	1A	Beech Creek at Hwy 82 nr. Waldo
UWBDT01	1A	Bayou Dorcheat at Hwy 355
UWBDT02	1A	Bayou Dorcheat at Hwy 82, 6 mi. W. of Waldo
UWBIG01	1A	Big Creek at Hwy 132 at Magnolia
UWHHC01	1A	Horsehead Creek at Hwy 19, 2 mi. N. of Walkerville
RED0054	1B	McKinney Bayou at Hwy. 296 east of Mandeville
RED0055	1B	McKinney Bayou at Hwy. 134 southeast of Fouke
UWBDK01	1B	Bois D'Arc Creek at Hwy 67 nr. Hope
UWBDK02	1B	Bois D'Arc Creek at Co. Rd. 7 mi. NW of Center Point

Ouachita River Basin		
Station No.	**Planning Segment**	**Station Description**
UWBFR01	2A	Boeuf River at Hwy 278, 4 mi. W. of Chicot
OUA 32	2A	Big Bayou at Hwy 144
OUA0172	2A	Ditch Bayou at G&F Access off US 82 near Lake Village
OUA0173	2A	Clay Bayou at Hwy 35
OUA0174	2A	Canal No. 43, Amos Bayou, at Hwy 35
OUA0175	2A	Macon Bayou at Hwy 1 near McArthur
OUA0176	2A	Amos Bayou off Hwy 1 near Rohwer
OUA0177	2A	Red Fork Bayou on Co. Rd. NE. of Kelso
OUA1078	2A	Oak Log Bayou at Co. Rd. off Hwy 277 southeast of Dumas
OUA0179	2A	Oak Bayou at Hwy 277 southeast of Dumas
OUA0180	2A	Cypress Creek on Co. Rd. off Hwy 277 southwest of Dumas
OUA0181	2A	Choctaw Bayou at Co. Rd. SW of Dumas
UWBGB01	2A	Big Bayou at Hwy 278, 5 mi. E. of Portland
UWBYM01	2A	Bayou Macon at Hwy 65 nr. Eudora
OUA0154	2B	Bartholomew at Hwy 278 west of Portland
UWBYB01	2B	Bayou Bartholomew at Hwy 82 nr. Thebes
UWBYB02	2B	Bayou Bartholomew at Hwy 4 nr. McGehee
UWBYB03	2B	Bayou Bartholomew at Hwy 54 at Garrett Bridge
AFS01	2C	Alum Fork Saline River at Hwy 5 east of Crows
MFS01	2C	Middle Fork Saline River on Co. Rd. S. of Crows off Hwy 5
NFS01	2C	North Fork Saline River on Hwy 5 near Benton
SFS01	2C	South Fork Saline River on Co. Rd. N. of Nance off US 70
OUA0166	2C	Hudgens Creek at Hwy 35 bridge, middle bridge
OUA167	2C	Derrieusseaux Creek at Hwy 35 bridge, northern most bridge
UWLGC01	2C	L'Aigle Creek at Farmville Road, 2 mi. SE of Farmville
UWLGC02	2C	L'Aigle Creek at Co. Rd., 2.5 mi. West of Ingalls
OUA0137A	2D	Flat Creek tributary at Hwy 7 spur near El Dorado
OUA0137B	2D	Flat Creek Tributary south of Norphlet on O'Rear Road
OUA0137C	2D	Flat Creek south of Norphlet on O'Rear Road
OUA0136D	2D	Salt Creek west of Norphlet on O'Rear Road
UWCHC01	2D	Champagnolle Creek at Hwy 4 near Hampton
OUA0165	2F	Ouachita River off Hwy. 270 above Stone Quarry Creek
OUA0168	2F	Whiteoak Creek at Hwy 128 bridge 3.5 miles north of Hwy 9
OUA0169	2F	Tulip Creek at Hwy 128, 4 mi. north of Hwy 9

Ouachita River Basin		
Station No.	**Planning Segment**	**Station Description**
OUA0170	2F	Cypress Creek at Hwy 7 bridge north of Sparkman,
UWDPC01	2F	Deceiper Creek at Co. Rd., 8 mi. S.E. of Gurdon
UWFRE01	2F	Freeo Creek at Hwy 9, 5 mi. W. of Bearden
UWLEF01	2F	L'Eau Frais Creek at Hwy 128 nr. Joan
UWMZC01	2F	Mazarn Creek at Hwy 227 nr. Sunshine
UWOAR01	2F	Ouachita River at Co. Rd. off Hwy 88 nr. Boardcamp
UWSFM01	2F	Little Mazarn Cr. At Co. Rd., 1.5 mi. N. of Pettyview
UWSFO01	2F	S. Fork Ouachita River at Hwy 270 at Mt. Ida
UWATR01	2G	Antoine River at Hwy 26 at Antoine
UWCYC01	2G	Caney Creek at Hwy 24 nr. Bluff City
UWMFC01	2G	Muddy Fork at Co. Rd. off Hwy 27 nr. Murfreesboro
UWOZC01	2G	Ozan Creek at Hwy 24 nr. Blevins
UWTNR02	2G	Terre Noir Creek at Hwy 53 2 mi. S. of Hollywood
UWTNR01	2G	Terre Noir Creek at Hwy 51, 2.5 mi. E. of Red Springs
UWTRC01	2G	Terre Rouge Creek at Hwy 19, 5 mi. S. of Prescott
UWBLF01	3E	Black Fork at TAR, 3.5 mi above Clear Fork Creek
UWCED01	3E	Big Cedar Creek at Hwy 28, 3 mi. E. of Cedat Creek
UWCLF01	3E	Clear Fork at TAR above Black. Fork, 8 mi. W. of Boyles
UWFLR01	3E	Fourche LaFave River at TAR nr. Boyles
UWGAF01	3E	Gafford Creek at Hwy 28 nr. Bluffton

Arkansas River Basin		
Station No.	**Planning Segment**	**Station Description**
UWBMO01	3B	Bayou Meto at Co. Rd. S.E. of Seaton Dump
UWBMO02	3B	Bayou Meto at Hwy 79, 2 mi S.W. of Stuttgart
ARK0130	3C	Fourche Creek at I-430 Bridge in Little Rock
ARK0131	3C	Fourche Creek at I-440 Bridge in Little Rock
ARK0140	3C	Little Maumelle River near Little Rock
UWPMB01	3C	Plum Bayou 1 mi. W. of Hwy 15 nr. Tucker
UWCCR01	3D	Cadron Creek at Co. Rd. 5 mi. W. of Wooster
UWCSC01	3D	Cypress Creek at Co. Rd. 2 mi S.E. of Hwy 92
UWEFC01	3D	East Fork Cadron Creek at Hwy. 287, 3 mi SE of Greenbrier
UWEFC02	3D	East Fork Cadron Creek at Hwy. 107 nr. Barney
UWNCC01	3D	North Cadron Creek at Hwy 65 near Damascus
UWNCC02	3D	North Cadron Creek at Co. Rd. 0.75 mi. N. Hwy 124

Arkansas River Basin		
Station No.	**Planning Segment**	**Station Description**
ARK036	3E	Fourche La Fave River at Hwy 113 south of Bigelow
ARK0136	3F	Palarm Creek at Hwy 36 east of Conway
UWEPR01	3F	East Fork Point Remove Creek at Hwy 95 nr. Hickory Hill
UWWPR01	3F	West Fork Point Remove Creek at Hwy 247 nr Atkins
UWPJR01	3G	Petit Jean River at Co. Rd. off Hwy 71 at Elm Park
UWPJR02	3G	Petit Jean River at Hwy 309 nr. Waveland
UWPJR03	3G	Petit Jean River at Hwy 10 at Danville
ARK0137	3H	Horsehead Creek at Hwy 64 east of Hartman
ARK0138	3H	Mulberry River at Hwy 103 west of Oark
ARK0139	3H	Mulberry River at low water bridge, 4.3 mi. E of Hwy 23 near Cass
ARK 47	3H	Frog Bayou at Hwy 282
ARK 08	3H	Lee Creek at Hwy 59
UWLCK01	3H	Lee Creek at Hwy 220, 10 mi. N. of Cedarville

White River Basin		
Station No.	**Planning Segment**	**Station Description**
UWBGC02	4A	Big Creek at Hwy 49 nr. Poplar Grove
UWBGC03	4A	Big Creek at Hwy 79, 3 mi. W. of Moro
UWCPC01	4A	Big Cypress Creek at Hwy 1, 4 mi. N.E. of Crossroads
UWLGB01	4A	LaGrue Bayou at Hwy 33 at LaGrue
UWLGB02	4A	LaGrue Bayou at Hwy 17 at LaGrue Springs
UWLLB01	4A	Little LaGrue Bayou at Hwy 1 nr. DeWitt
WHI0037	4A	Big Creek at Hwy 318 near Watkins Corner
UWBDV02	4B	Bayou DeView at Hwy 64 east of McCrory
WHI033	4B	Bayou DeView at Hwy 70
WHI032	4B	Cache River at Hwy 70
UWCHR02	4B	Cache River at Hwy 64 at Petterson
UWCHR03	4B	Cache River at Hwy 18 near Gruggs
UWCHR04	4B	Cache River at Hwy 412 east of Walnut Ridge
UWDTC01	4C	DePartee Creek east of Bradsford
UWGSC01	4C	Glaise Creek at Hwy 64 east of Bald Knob
UWVGC01	4C	Village Creek at Hwy 37 east of Tuckerman
UWVGC02	4C	Village Creek at Hwy 228 at Miniturn
UWVGC03	4C	Village Creek at Hwy 224 near Newport

White River Basin		
Station No.	**Planning Segment**	**Station Description**
WHI0163	4C	Departee Creek at Co. Rd east of Thida
WHI056	4D	Bayou DesArc at Hwy 11
UWBDA01	4D	Bayou DesArc at county road above Cypress Bayou
UWBLB01	4D	Bull Creek at Hwy 367 near Beebe
UWCPB01	4D	Cypress Bayou at Hwy 13 S.E. of Beebe
WHI0153	4E	Meadow Creek on Co. Rd. NE of Old Lexington
UWAFK01	4E	Archey Fork Little Red River at Hwy 65 at Clinton
UWBCK01	4E	Big Creek off Hwy 110 near Hiram
UWBCR01	4E	Big Creek at Hwy 16 near Letona
UWMFK01	4E	Middle Fork Little Red River at Hwy 65 nr. Leslie
UWOFC01	4E	Overflow Creek 1.5 miles SE of Judsonia
UWSRR01	4E	South Fork Little Red River at Hwy 95 nr. Scotland
UWSRR02	4E	South Fork Little Red River at Hwy 65 at Clinton
UWTMC01	4E	Ten Mile Creek at Hwy 157 north of Providence
WHI0167	4F	Greenbrier Creek @ Hwy 25 near Batesville
WHI0166	4F	Salado Creek near Salado
WHI0164	4F	Big Creek near Magness
WHI0169	4F	Poke Bayou near Batesville
WHI0168	4F	Piney Creek near Boswell
WHI0146	4F	White River near Norfork
WHI0029	4F	White River @ Oil Trough
UWBKR01	4G	Black River above Strawberry River near Saffell
UWBKR02	4G	Black River at Hwy 37 east of Cord
UWCAC01	4G	Curia Creek at Hwy 25 north of Dowdy
UWNBC01	4G	North Big Creek off Hwy 354 east of Center
UWRDC01	4G	Reeds Creek at Hwy 117 north of Strawberry
UWSBR01	4G	Strawberry River off Hwy 354near Wiseman
UWSBR02	4G	Strawberry River at Hwy 167 at Evening Shade
UWSBR03	4G	Strawberry River at Hwy 361 near Saffell
WHI0165	4G	Data Creek near Mt Zion
UWJNC01	4H	Janes Creek at Hwy 90 near Ravenden Springs
UWMTC01	4H	Martins Creek at Hwy. 63 near Williford
WHI0171	4H	Myatt Creek @ Bakers Ford Rd near Saddle
WHI0152	4J	Big Creek at Hwy 14 W. of Big Flat
UWBRK01	4J	Bear Creek at Hwy 65, 4 mi. W. of Marshall

White River Basin		
Station No.	**Planning Segment**	**Station Description**
WHI0088	4H	Spring River at Hardy
WHI0089	4H	Spring River at Mammoth Spring
WHI006a	4H	Warm Fork of Spring River near Thayer, Missouri
WHI0059	4E	Little Red River below Searcy
WHI021	4H	Spring River at Ravenden
WHI05b	4H	Eleven Point River near Pocahontas
WHI0170	4G	Fourche Creek @Hwy 166 N of Pocahontas
WHI0004	4G	Current River near Pocahontas
WHI0026	4B	Bayou DeView west of Gibson
WHI0025	4G	Black River at Pocahontas
WHI0023	4H	South Fork Spring River near Saddle
WHI0046	4F	White River near Norfork
WHI0152	4J	Big Creek @Hwy 14 near Big Flat

St. Francis River Basin		
Station No.	**Planning Segment**	**Station Description**
FRA0027	5A	Blackfish Bayou at Hwy 50 near Woldwood
FRA0028	5A	15 Mile Bayou at Simsboro Road near Proctor
FRA0029	5A	10 Mile Bayou at Hwy 147 near Edmondson
FRA0032	5A	Tyronza River at Hwy 184 near Earle
FRA0033	5A	Tyronza River at Hwy135 near Tyronza
FRA0036	5A	St. Francis River at Hwy 140 at Marked Tree
FRA0030	5B	First Creek Trib to L’Anguille near Horton
FRA0031	5B	Second Creek at Hwy 284 near Penrose
FRA0034	5B	Caney Creek at Hwy 350 near Wynne
FRA0035	5B	Prairie Creek at Hwy 1 north of Vanndale
UWLGR01	5B	L’Anguille River at Hwy 306, 3 mi. W. of Colt
UWLGR02	5B	L’Anguille River at Hwy 214, 3 mi. W. of Whitehall
FRA0037	5C	Left Hand Chute of Little River at Hwy 140 near Lepanto
FRA0038	5C	Right Hand Chute Little River at a Hwy 135 at Riverdale

Table III-3: Recent Special Projects

Strawberry River (2001-2003)	
Station No.	**Station Description**
WHI0143A	Strawberry River @ AR Hwy 9 bridge, 4 mi N of Oxford
WHI0143E	Little Strawberry River @ Co. bridge W of AR 289 at Morriston
WHI0143H	Little Strawberry River @ AR Hwy 354 bridge 1.5 mi E of Wiseman
WHI0143B	Strawberry River @ AR Hwy 56 bridge 1.8 mi E of AR Hwy 289
UWSBR01	Strawberry River south of AR Hwy 354 W of Horseshoe Bend
UWSBR02	Strawberry River @US Hwy 167, 2.5 mi N of AR Hwy 56
WHI0143L	Piney Fork Creek @ Co. Rd west of Zion
WHI0143M	Piney Fork Creek @ US Hwy 167 1.5 mi N of AR Hwy 56
WHI0143I	North Big Creek @ AR Hwy 354 1.4 mi E of US Hwy 167
UWNBC01	North Big Creek, Co Rd off AR Hwy 354 SE of Center
WHI0143P	Strawberry River AR Hwy 58, 3 mi N of AR Hwy 58
WHI0143N	Mill Creek, Strawberry River Rd S of Sitka
WHI0024	Strawberry River @ AR Hwy 115 N of Strawberry
WHI0143K	South Big Creek@ AR Hwy 58, 1 mi N of AR Hwy 115
WHI0143J	South Big Creek @ AR Hwy 11, .2 mi S of AR Hwy 115
WHI0143S	Cooper Creek @ Co Rd bridge, 0.8 mi E of AR Hwy 115
UWRDC01	Reed’s Creek @ AR Hwy 117, 2.8 mi S of AR Hwy 115
UWSBR03	Strawberry River @ AR Hwy 361, 2.2 mi E of AR Hwy 25
WHI0143Q	Caney Creek @ AR Hwy 25, 1 mi S of Saffell
WHI0143R	Caney Creek @ Co Rd 346, 1 mi S of AR Hwy 361

Buffalo River Project (Planning Segment 5J) (1999-Present)	
Station No.	**Station Description**
BUFR01	Buffalo River at Wilderness Boundary
BUFR02	Buffalo River at Ponca
BUFR03	Buffalo River at Pruitt
BUFR04	Buffalo River at Hasty
BUFR05	Buffalo River at Woolum
BUFR06	Buffalo River at Gilbert
BUFR07	Buffalo River at Ar. Hwy 14
BUFR08	Buffalo River at Rush
BUFR09	Buffalo River at Mouth
BUFT01	Beech Creek
BUFT02	Ponca Creek

Buffalo River Project (Planning Segment 5J) (1999-Present)	
Station No.	**Station Description**
BUFT03	Cecil Creek
BUFT04	Mill Creek - Newton County
BUFT05	Little Buffalo River
BUFT06	Big Creek - Newton County
BUFT07	Davis Creek
BUFT08	Cave Creek
BUFT09	Richland Creek
BUFT10	Calf Creek
BUFT11	Mill Creek - Searcy County
BUFT12	Bear Creek
BUFT13	Brush Creek
BUFT14	Tomahawk Creek
BUFT15	Water Creek
BUFT16	Rush Creek
BUFT17	Clabber Creek
BUFT18	Big Creek - Marion County
BUFT19	Cedar Creek
BUFT23	Middle Creek
BUFT24	Leatherwood Creek
BUFT25	Little Buffalo River above Jasper
BUFT26	Little Buffalo River below Jasper
BUFS02	Luallen Spring
BUFS33	Mitch Hill Spring
BUFS41	Gilbert Spring

Table III-4: Historical Special Projects

Name	Project Year(s)
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
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 all other documents and reports produced by the Water Quality Management Planning Section of the Water Division can be downloaded from the Departments' website at www.adeq.state.ar.us/water/reports_data.htm.

Table III-5: Parameters Sampled at Water Quality Monitoring Stations

Routinely Sampled

AIR TEMPERATURE	BORON
WATER TEMPERATURE	BERYLLIUM
PH	BARIUM
TURBIDITY	CADMIUM
DISSOLVED OXYGEN	CHROMIUM
5-DAY BIOCHEMICAL OXYGEN DEMAND	COPPER
FILTRABLE RESIDUE	CALCIUM
NONFILTRABLE RESIDUE	LEAD
CHLORIDES	ZINC
SULFATES	IRON
AMMONIA NITROGEN	POTASSIUM
NITRITE+NITRATE NITROGEN	MAGNESIUM
TOTAL PHOSPHORUS	MANGANESE
ORTHO-PHOSPHORUS	SODIUM
TOTAL HARDNESS	NICKEL
	COBALT
	VANADIUM

A suite of 50 pesticides is analyzed from selected Ambient and Roving Water Quality monitoring stations during the growing season. The majority of the stations are located in the row-crop agriculture sections of the Delta and Arkansas River Valley ecoregions.

Figure III-1: Water Quality Monitoring Stations

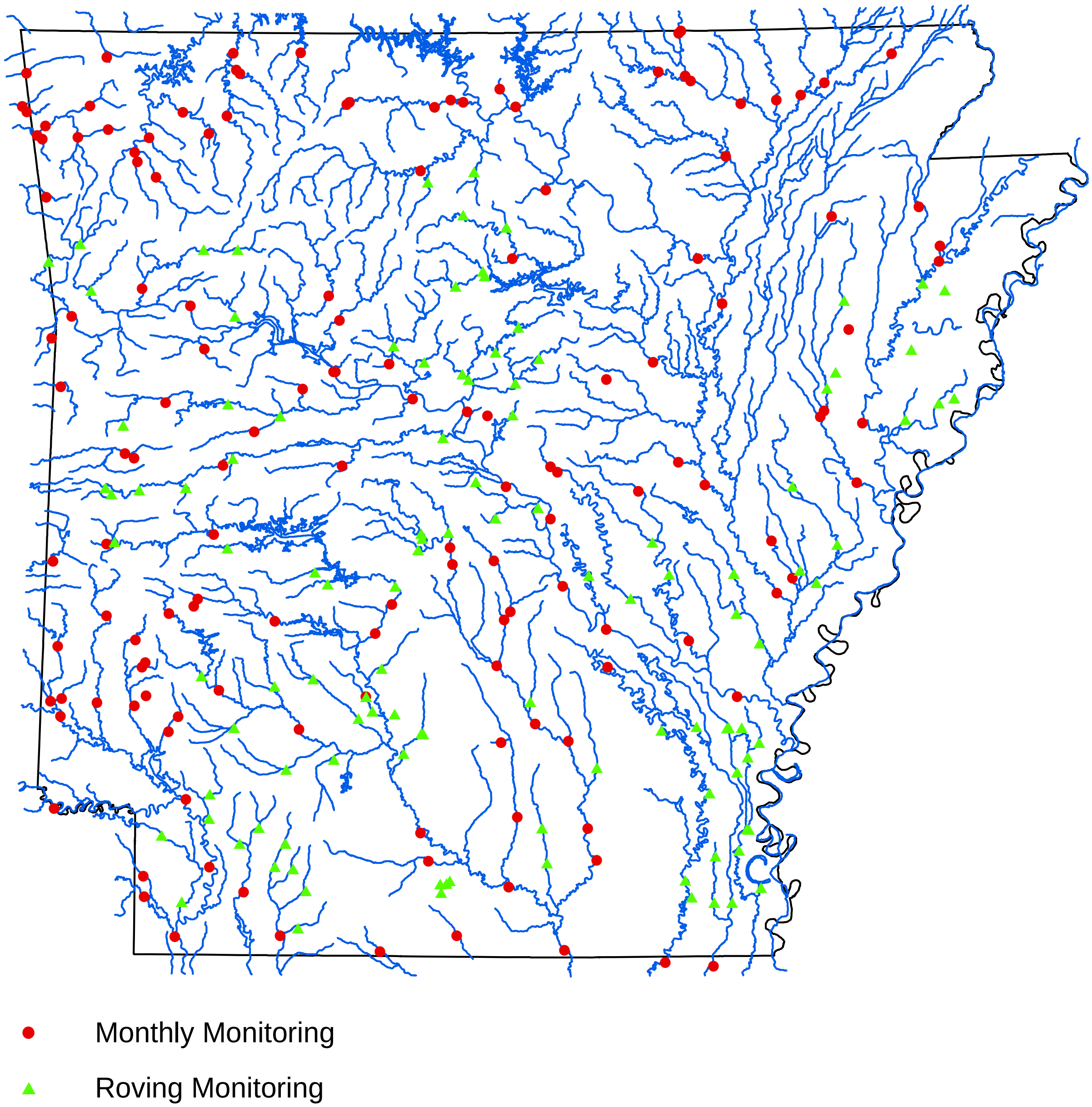
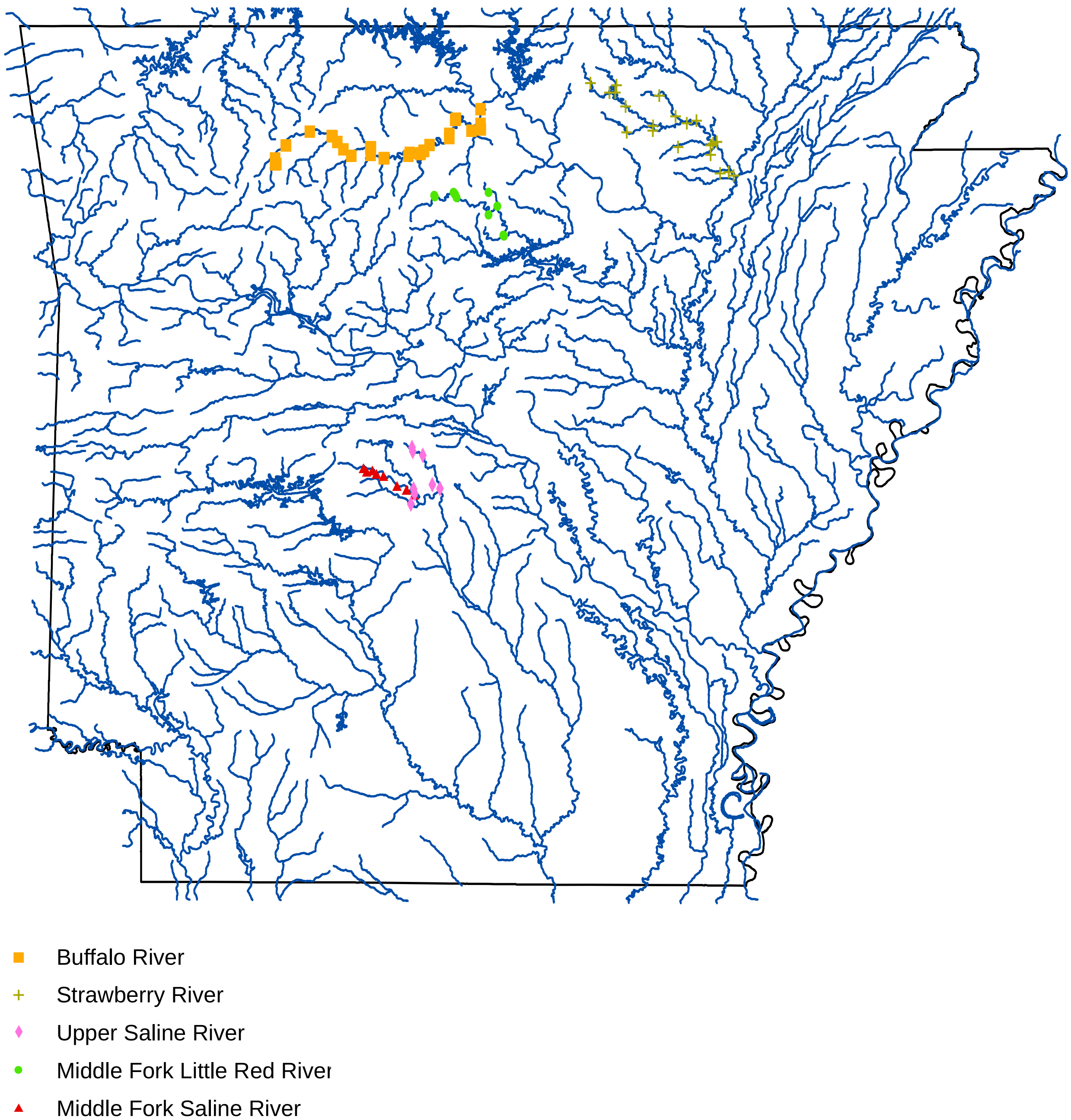


Figure III-2: Special Projects Monitoring Stations



Biomonitoring

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; EPA 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 1970's. Improved rapid bioassessment techniques (RBP Second Edition) (Barbour et al. 1999; Shackleford, 1988) have greatly increased the benthic assessment efficiency and effectiveness and have allowed more extensive use of this monitoring approach.

Bacteriological Program

The bacteriological monitoring network has been substantially modified during the past several years. Due to 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. The quarterly and bimonthly monitoring of the unassessed waters includes bacteriological analyses at all sites. The monthly monitored sites were sampled for bacteria on a rotating basis, resulting in approximately 8 samples per site per year during the swimming season.

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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 305(b) 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 142 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 171 stations on previously unassessed waters which are 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 requirements for both the 305(b) reporting and the 303(d) listing and utilizes the same methodology for both activities.

The criteria within this assessment methodology are utilized to determine support or non-support 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 will 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 which are expected to be exceeded occasionally, but which are permitted as “never to exceed” to prevent a high frequency of exceedances and a resulting chronic impairment. A one-time exceedance of the 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 2004 Integrated Water Quality Monitoring and Assessment Report (305b Report) was from ADEQ's physical/chemical water quality monitoring network. The network includes 142 Ambient Network stations that were sampled monthly, 171 Roving Network stations that were sampled on a bi-monthly schedule, and 87 stations that were sampled as part of special study projects. The period of record from which this data was assimilated is October 1, 1998 through September 30, 2003.

In addition, other agencies that routinely collect water quality data, e.g. USGS, USCOE, USFS, ASWCC, AWRC, were solicited for data that demonstrates impaired waterbodies. The period of record for which data will be accepted will be within the last five (5) years, and all data used must be collected and analyzed under a quality-assurance/quality-control protocol equivalent to or more stringent than that of ADEQ or the USGS.

Assessment

ADEQ must take into consideration the possibility of naturally occurring or anthropogenic disruptions that may cause a single exceedance of a standard which should not result in the listing of a stream as impaired. Therefore, ADEQ will use the ‘round up to the next whole number’ process to determine exceedances.

In order to make a monitored assessment of a stream segment, data collection generally follows a monthly or bimonthly sampling regime. A determination of non-support will be based on percent exceedance of at least 12 samples. However, for bacteria sampling conducted during the primary contact season where it is impractical to conduct 12 sampling events, a minimum of four samples will be required for 'non-support' determination. An assessment of 'support' can be made with less than 12 monthly samples, but will require a minimum of four in conjunction with any additional data and/or visual evaluation of the waterbody and its watershed.

The percent exceedance criteria as shown in the Ecoregion Assessment Criteria are calculated using the total number of samples collected. The number of data points exceeding the criteria which are necessary for a "non-support" decision will be calculated and rounded up to the nearest whole number, e.g. 25% of 38 data points = 9.5 or10 exceedances equal 25%.

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 an 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 "support" 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.

Numeric Criteria - 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.

Turbidity will be evaluated for both 'base flow' conditions and year-round conditions ('all flows'). If a waterbody is not meeting either of these conditions, it will be listed as not supporting turbidity water quality standards. Base flow conditions represent the critical season when rainfall is infrequent and is applied to the months of June through October. The turbidity criterion in section 2.503 of Regulation No. 2 is applicable for base flow turbidity evaluations. If greater than 25% of the total samples for the period of record from the months June through October exceed the base flow criterion, the waterbody will be listed on the 303(d) list as being impaired for turbidity. The year-round assessment takes into account all flows including storm flows and is therefore considered protective of water quality year-round. The document titled "Determination of Turbidity and Suspended Solids Values for Storm Events" describes the need and justification for setting targets for use in assessing turbidity at all flows. A turbidity target for all flows has been established as the 90th percentile of ecoregion values based on 10 years of data from over 70 stations sampled monthly. Because turbidity increases significantly above the 90th percentile, the top 10% of the turbidity values are considered a rare occurrence and would not be appropriate levels to maintain during ordinary storm events. Therefore, if greater than 15% of the total samples from the period of record for all flows exceed the all flow turbidity target, the waterbody will be listed on the 303(d) list as being impaired for turbidity.

Mineral quality will be evaluated as follows: Assessments for waterbodies with site specific criteria are made according to the specific values listed in section 2.511 of Regulation No. 2. 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 section 2.511 of Regulation No. 2 will apply. In either case, if greater than 10% 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 section 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 section 2.511 of Regulation No.2, waters exceeding the ecoregion values more than 50% of the time should be considered as candidates for a modification in accordance with section 2.306 of Regulation No. 2.

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

Listing of Waterbodies

Arkansas' waterbodies are assessed based on the RF3 stream reach classification. Individual stream reaches that are assessed as not attaining their respective designated use(s) will be included on the 303(d) list. A subcategory of streams will be established for waterbodies that are currently not meeting criteria under existing water quality standards. These waterbodies should meet their designated uses under the proposed water quality standards revision, i.e. turbidity and bacteria. For this subcategory, a TMDL will not be developed until further evaluation indicates whether or not a TMDL is warranted. These waterbodies will be listed as low priority TMDL's in Category 5.

Designated Uses - 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 and magnitude established in the assessment criteria for that parameter or otherwise does not meet a descriptive, designated use.

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 which alters the aquatic life community structure beyond that expected
Drinking Water	Compounds which are not easily removed by drinking water treatment facilities; compounds with established secondary MCL=s, e.g., Cl, SO4, TDS, NO3
Primary and Secondary Contact	Fecal coliform

Agriculture or Industrial UsesCompounds which 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

Fish Consumption - 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 listed as “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 not be listed as “non-support”

Antidegradation - In compliance with the ADEQ antidegradation policy, a Tier 3 (ERW) 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

Following are ecoregion or stream segment specific assessment criteria which were used to list all assessed waterbodies as either supporting or not supporting the designated uses. These criteria are developed from Arkansas’ Water Quality Standards (ADEQ Regulation No. 2) and, in part, from EPA guidance for determining support or non-support of a waterbody.

Keys 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.

Table III-6: Assessment Criteria Tables

Assessment Criteria for Ozark Highlands Ecoregion Streams

Parameter	Ecoregion Standard		Support		Non-Support	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE	29 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=< 10%		>10%	
<10 MI^2	6	2				
10-100 MI^2	6	5				
> 100 MI^2	6	6				
Trout Waters	6	6				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	12.1 mg/L		=< 1		>1	
CHRONIC	1.3 mg/L		=< 25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=< 10%		>10%	
CL/SO_4/TDS	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)	16.0	11.0	=< 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%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	10 NTU		=< 25%		>25%	
All Flows	17 NTU [4]		=< 15%		>15%	
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	31 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
<10 MI^2	6	2				
> 10 MI^2	6	6				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	39.1 mg/L		=<1		>1	
CHRONIC	2.3 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	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)	16.0	11.0	=<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)	35.0	32.3	=<1	=<10%	>1	>10%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	10 NTU		=< 25%		>25%	
All Flows	19 NTU [4]		=< 15%		>15%	
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	31 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
<10 MI^2	5	2				
10-150 MI^2	5	3				
151-400 MI^2	5	4				
>400 MI^2	5	5				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	44.6 mg/L		=<1		>1	
CHRONIC	2.4 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	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)	16.0	11.0	=<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)	35.0	32.3	=<1	=<10%	>1	>10%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	21 NTU		=< 25%		>25%	
All Flows	40 NTU [4]		=< 15%		>15%	
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	30 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
<10 MI^2	6	2				
>10 MI^2	6	6				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	29.5 mg/L		=<1		>1	
CHRONIC	2.0 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	250/250/500		=<10%		>10%	
DISS. METALS[2] (ug/L)	Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)	1.0	0.4	=<1	=<10%	>1	>10%
CHROMIUM (Cr)	16.0	11.0	=<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%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	10 NTU		=< 25%		>25%	
All Flows	18 NTU [4]		=< 15%		>15%	
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	30 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
<10 MI^2	5	2				
10-500 MI^2	5	3				
>500 MI^2	5	5				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	42.0 mg/L		=<1		>1	
CHRONIC	2.3 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	250/250/500		=<10%		>10%	
DISS. METALS[2] (ug/L)	Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)	1.0	0.4	=<1	=<10%	>1	>10%
CHROMIUM (Cr)	16.0	11.0	=<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%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	21 NTU		=< 25%		>25%	
All Flows	32 NTU[4]		=< 15%		>15%	
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	30 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
<10 MI^2	5	2				
10-100 MI^2	5	3				
>100 MI^2	5	5				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	19.9 mg/L		=<1		>1	
CHRONIC	1.6 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	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)	16.0	11.0	=<1	=<10%	>1	>10%
COPPER (Cu)	14.0	9.5	=<1	=<10%	>1	>10%
LEAD (Pb)	51.3	2.0	=<1	=<10%	>1	>10%
ZINC (Zn)	95.7	87.4	=<1	=<10%	>1	>10%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	45 NTU		=< 25%		>25%	
All Flows	84 NTU[4]		=< 15%		>15%	
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	30 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
ALL WATERS	6	5				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	48.8 mg/L		=<1		>1	
CHRONIC	2.5 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	250/250/500		=<10%		>10%	
DISS. METALS[2] (ug/L)	Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)	1.0	0.4	=<1	=<10%	>1	>10%
CHROMIUM (Cr)	16.0	11.0	=<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%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	21 NTU		=< 25%		>25%	
All Flows	32 NTU[4]		=< 15%		>15%	
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	32 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
<10 MI^2	5	2				
10-100 MI^2	5	3				
>100 MI^2	5	5				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	19.9 mg/L		=<1		>1	
CHRONIC	1.61 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	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)	16.0	11.0	=<1	=<10%	>1	>10%
COPPER (Cu)	14.0	9.5	=<1	=<10%	>1	>10%
LEAD (Pb)	51.3	2.0	=<1	=<10%	>1	>10%
ZINC (Zn)	95.7	87.4	=<1	=<10%	>1	>10%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	75 NTU		=< 25%		>25%	
All Flows	250 NTU[4]		=< 15%		>15%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for White River (Main Stem)

Parameter	Standard		Support		Non-Support	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE			=< 10%		>10%	
DAM #1 TO MOUTH	32 C					
OZARK HIGHLANDS	29 C					
TROUT WATERS	20 C					
DISSOLVED OXYGEN	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						
LOWER WHITE RIVER ACUTE	14.4 mg/L		=<1		>1	
CHRONIC	1.3 mg/L		=<25%		>25%	
TROUT WATERS (acute)	9.7 mg/l		=<1		>1	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	250/250/500		=<10%		>10%	
DAM #3 TO MO. LINE	20/20/180[1]		=<10%		>10%	
MO. LINE TO HEADWATERS	20/20/160[1]		=<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)	16.0	11.0	=<1	=<10%	>1	>10%
COPPER (Cu)	19.6	12.9	=<1	=<10%	>1	>10%
LEAD (Pb)	75.9	3.0	=<1	=<10%	>1	>10%
ZINC (Zn)	129.8	118.5	=<1	=<10%	>1	>10%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
DELTA Base Flows	45 NTU		=< 25%		>25%	
All Flows	84 NTU[4]		=< 15%		>15%	
OZARK HIGHLANDS Base Flows	10 NTU		=< 25%		>25%	
All Flows	17 NTU[4]		=< 15%		>15%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for St. Francis River

Parameter	Standard		Support		Non-Support	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE	32 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
ALL WATERS	5	5				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	19.9 mg/L		=<1		>1	
CHRONIC	1.6 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	250/250/500		=<10%		>10%	
MOUTH TO 36^0 N. LAT.	10/30/330[1]		=<10%		>10%	
36^0 N. LAT. TO 36^0 30'N LAT.	10/20/180[1]		=<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)	16.0	11.0	=<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%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	75 NTU		=< 25%		>25%	
All Flows	100 NTU[4]		=< 15%		>15%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Arkansas River

Parameter	Standard		Support		Non-Support	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE	32 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
ALL WATERS	5	5				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	26.2 mg/L		=<1		>1	
CHRONIC	1.9 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	250/250/500		=<10%		>10%	
MOUTH TO L&D #7	250/100/500[1]		=<10%		>10%	
L&D #7 TO L&D #10	250/100/500[1]		=<10%		>10%	
L&D #10 TO OK LINE	250/120/500[1]		=<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)	16.0	11.0	=<1	=<10%	>1	>10%
COPPER (Cu)	21.0	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%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	50 NTU		=< 25%		>25%	
All Flows	52 NTU[4]		=< 15%		>15%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Ouachita River Below Lake Catherine

Parameter	Standard		Support		Non-Support	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE						
L. MISSOURI TO S.LINE	32 C		=< 10%		>10%	
ABOVE L. MISSOURI	30 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=< 10%		>10%	
ALL WATERS	5	5				
pH	6 to 9 standard pH units		=< 10%		>10%	
T. AMMONIA-N						
ACUTE	36.1 mg/L		=< 1		>1	
CHRONIC	2.2 mg/L		=< 25%		>25%	
NO3-N (D.W.)	10 mg/L (drinking water)		=< 10%		>10%	
CL/SO4/TDS	250/250/500		=< 10%		>10%	
LA LINE TO CAMDEN	160/40/3501		=< 10%		>10%	
CAMDEN TO CARPENTER DAM	50/40/1501		=< 10%		>10%	
CARPENTER DAM TO HEADWATERS	10/10/1001		=< 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)	16.0	11.0	=<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%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	21 NTU		=< 25%		>25%	
All Flows	32 NTU[4]		=< 15%		>15%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Red River

Parameter	Standard		Support		Non-Support	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE	32 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
ALL WATERS	5	5				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	14.4 mg/L		=<1		>1	
CHRONIC	1.3 mg/L		=<25%		>25%	
NO3-N (D.W.)	10 mg/L		=<10%		>10%	
CL/SO4/TDS	250/250/500		=<10%		>10%	
OK LINE TO CONFLUENCE WITH LITTLE RIVER	250/200/8501		=<10%		>10%	
LITTLE RIVER TO LA LINE	250/200/5001		=<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)	16.0	11.0	=<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%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	50 NTU		=< 25%		>25%	
All Flows	150 NTU[4]		=< 15%		>15%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Assessment Criteria for Mississippi River

Parameter	Standard		Support		Non-Support	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE	32 C		=< 10%		>10%	
DISSOLVED OXYGEN	Primary	Critical	=<10%		>10%	
ALL WATERS	5	5				
pH	6 to 9 standard pH units		=<10%		>10%	
T. AMMONIA-N						
ACUTE	19.9 mg/L		=<1		>1	
CHRONIC	1.6 mg/L		=<25%		>25%	
NO_3-N (D.W.)	10 mg/L (drinking water)		=<10%		>10%	
CL/SO_4/TDS	250/250/500		=<10%		>10%	
LA LINE TO AR RIVER	60/150/425[1]		=<10%		>10%	
AR RIVER TO MO LINE	60/175/450[1]		=<10%		>10%	
DISS. METALS[2] (ug/L)	Acute	Chronic	Acute[3]	Chronic	Acute[3]	Chronic
CADMIUM (Cd)	3.7	1.0	=<1	=<10%	>1	>10%
CHROMIUM (Cr)	16.0	11.0	=<1	=<10%	>1	>10%
COPPER (Cu)	17.0	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%
FECAL COLIFORM						
PRIM.CONTACT	400 col/100 ml (apr-sept)		=< 25%		>25%[1]	
SEC.CONTACT	2000 col/100 ml(anytime)		=< 25%		>25%[1]	
TURBIDITY						
Base Flows	50 NTU		=< 25%		>25%	
All Flows	75 NTU[4]		=< 15%		>15%	
FISH CONSUMPTION			No restriction or limited consumption		No consumption for any user group	

Chemical Parameters

The following tables summarize the use support of the Category 5a 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.

Designated Use Support in Arkansas **Type of Waterbody: Stream Miles**			
Degree of Use Support	**Assessment Basis**		**Assessed Total**
	Evaluated	**Monitored**	
Supporting all assessed uses	2484.7	5189.0	7673.7
Not supporting a use	200.1	1431.9	1632.0
Total Waters Assessed	2684.8	6620.9	9305.7

Designated Use Support of Assessed Waters by Use Type **Type of Waterbody: Stream Miles**		
Use	**Support**	**Non-Support**
Fish consumption	9011.0	294.7
Aquatic life	8175.0	1130.7
Primary contact	9184.2	121.5
Secondary contact	9305.7	0.0
Domestic Water Supply	9025.0	280.7
Agri & industrial Water Supply	9086.8	218.9

Total Sizes of Waters Listed in Category 5a Not Supporting Uses by Various Cause Categories		
Cause Categories	**Stream Segments**	**Stream Miles**
Nitrogen	7	87.4
Phosphorus	1	12.8
Chlorides	7	215.5
Sulfates	2	24.5
Total Dissolved Solids	14	245.2
Siltation/Turbidity	41	944.2
Pathogen Indicators	9	121.5
Aluminum	1	20.3
Copper	9	123.9
Lead	1	20.3
Zinc	5	68.3
Mercury	20	417.7
Priority Organics	1	65.7
Organic Enrichment/DO	4	19.2
Ammonia	2	11.5
Temperature	2	31.7

Total Sizes of Waters Listed in Category 5a Not Supporting Uses by Various Source Categories		
Source Categories	**Stream Segments**	**Stream Miles**
Agriculture	20	680.5
Surface erosion	12	153.8
Resource extraction	6	96.9
Silviculture	0	0
Urban run-off	0	0
Road Construction	2	33.4
Industrial point sources	7	82.5
Municipal point sources	9	96.4
Hydropower	3	9.2
Unknown	22	307.1

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 350 aquatic life samples were collected for use support determination between 1999 and 2004. The samples were collected as either a part of a watershed assessment surveys, or a survey to establish ecoregion based indices of biotic integrity. Also, from 1991 to 2000, aquatic macroinvertebrate community samples and/or fish community samples were collected at approximately 262 stations resulting in over 500 biological sample collection from across the State. Some of these samples were part of the special project surveys listed in Part III, Chapter 1. The data is accessible on line at www.adeq.state.ar.us/compsvs/webmaster/databases.htm.

The macroinvertebrate communities were collected and evaluated following the Departments' 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 EPA'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' 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 Departments Quality Assurance Project Plan.

Table III-7 lists the stream segments where biological communities were collected for aquatic life use attainment determination or reference stream characterization between 1999 and 2000.

Data Analyses for Pesticides Collected During 1999, 2000 and 2001

Metolachlor was detected in 89% of the samples and at 69 of the stations; molinate was detected in 73% of the samples and was present at 46 of the sampled stations; and bentazon was found in 69% of the samples and at 41 of the stations. The most elevated pesticide concentrations detected during this reporting period were 35.01 ug/L molinate in Amos Bayou near Rohwer , 11.06 ug/L aciflourfen in Oak Log Bayou near Watson and 9.15 ug/L metolachlor in Deep Bayou near the City of Grady. The herbicides 2-4-D and atrazine were also detected quite frequently at many of the stations throughout the delta. Metolachlor, molinate and bentazon were responsible for 39% of the detections listed in Table III-7.

Table III-7: 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
Friley Creek	1999	11110201	-012	3H	Boston Mountains	X	X
Hurricane Creek	1999	11110202	-022	3H	Boston Mountains	X	X
Indian Creek	1999	11110202	-020	3H	Boston Mountains	X	X
Little Mulberry	1999	11110201	-012	3H	Boston Mountains	X	X
Wilburn Creek	1998	11010014	-014t	4E	Boston Mountains	X	X
Salado Creek	1998	11010004	-012	4F	Boston Mountains	X	X
Cave Creek	1999	11010005	-023	4J	Boston Mountains	X	X
Bear Creek	1999	11010005	-026	4J	Boston Mountains	X	X
Dials Creek	1998	08020304	-014t	4A	Delta	X	X
Hurricane Creek	1998	08020301	-015t	4D	Delta	X	X
Bear Creek	1998	08020203	-001t	5A	Delta	X	X
Cypress Creek	1998	08020205	-002t	5B	Delta	X	X
Cypress Creek	2000	11140203	026	1A	Ty Gulf Coastal Plains	X	X
Hanks Creek	2000	08040205	001t	2B	Ty Gulf Coastal Plains	X	X
Beech Creek	2000	08040205	001t	2B	Ty Gulf Coastal Plains	X	X
Flat Creek	2000	08040204	002t	2C	Ty Gulf Coastal Plains	X	X
Caney Bayou	2000	08040202	-003t	2D	Ty Gulf Coastal Plains	X	X
Caney Creek	2000	08040103	035	2G	Ty Gulf Coastal Plains	X	X
Sandy Bois D' Arc	2000	11040201	009t	1B	SI Gulf Coastal Plains	X	X
L. Eau Frais Creek	2000	8040102	003	2F	SI Gulf Coastal Plains	X	X
Greasy Creek	2000	8040102	003t	2F	SI Gulf Coastal Plains	X	X
East Fork Tulip	2000	8040102	030	2F	SI Gulf Coastal Plains	X	X
Brushy Creek	1998	11140109	-020	1C	Ouachita Mountains	X	X
Big Fork Creek	1999	08040101	-036t	2F	Ouachita Mountains	X	X
Collier Creek	1999	08040101	-020t	2F	Ouachita Mountains	X	X
Fiddlers Creek	1998	08040101	-032	2F	Ouachita Mountains	X	X
Irons Fork Creek	1998	08040101	-038	2F	Ouachita Mountains	X	X
Polk Creek	1999	08040101	-022t	2F	Ouachita Mountains	X	X
South Fork Ouachita	1999	08040101	-043	2F	Ouachita Mountains	X	X
Piney Creek	1999	11010004	-007	4F	Ozark Mountains	X	X
West Livingston	1999	11010004	-006t	4F	Ozark Mountains	X	X
Wideman Creek	1999	11010004	-005t	4F	Ozark Mountains	X	X
Rock Creek	1999	11010012	-007t	4G	Ozark Mountains	X	X
Strawberry River	1999	11010012	-011	4G	Ozark Mountains	X	X

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**
Diles Creek	1999	11010011	-002t	4H	Ozark Mountains	X	X
Weldon Creek	1999	11010010	-018t	4H	Ozark Mountains	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**
South Fork Spavinaw Creek	2000	11070209	-048t	3J	Ozark Highlands	X	
Flint Creek	2000	11110103	-031	3J	Ozark Highlands	X	
Cincinnati Creek	2000	11110103	-021	3J	Ozark Highlands	X	
Mud Creek	2000	11110103	-029t	3J	Ozark Highlands	X	
Hicks Creek	2000	11010006	-015	4F	Ozark Highlands	X	
South Fork Spring River	2000	11010010	-012t	4H	Ozark Highlands	X	
Crooked Creek	2000	11010003	-049t	4I	Ozark Highlands	X	
West Fork White River	2000	11010001	-024	4K	Ozark Highlands	X	
War Eagle Creek	2000	11010001	-034	4K	Ozark Highlands	X	
Kings River	2000	11010001	-037	4K	Ozark Highlands	X	
Long Creek	2000	11010001	-054	4K	Ozark Highlands	X	
Yocum Creek	2000	11010001	-052	4K	Ozark Highlands	X	
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	

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**
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	
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 River	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 Creek	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 Creek	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 Ditch	2003	08020204	-xxx	5C	Delta	X	

Saline River Forks Physical, Chemical, and Biological Community Assessment (*1993, 1997, 1999, 2003)							
Stream Name	**Year Sampled**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrate Data Collected**	**Fish Community Data Collected**
North Fork Saline River	*	08040203	-011	2C	Ouachita Mountains	X	X
Alum Fork Saline River	*	08040203	-014	2C	Ouachita Mountains	X	X
Middle Fork Saline River	*	08040203	-019	2C	Ouachita Mountains	X	X
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
South Fork Saline River	*	08040203	-020	2C	Ouachita Mountains	X	X
Hurricane Creek	*	08040203	-006	2C	Gulf Coastal Plains	X	X

Strawberry River Physical, Chemical, and Biological Community Assessment (2001-2003)							
Stream 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

The station on Big Creek (WHI37) had the highest number of pesticide detections recorded during this reporting period. This station is located in western Lee County and was sampled on two occasions. Western Lee and eastern Monroe counties are utilized extensively for rice, soybean and cotton production. All stations located in Planning Segment 4A had numerous pesticide detections. Metolachlor, molinate and bentazon were responsible for 33% of the detections in this planning segment.

Melton's Creek (OUA148) and Bayou Bartholomew near Portland (OUA154) had the highest number of detections in Planning Segment 2B. Metolachlor, molinate and bentazon were detected from both of these stations and from the other stations located within this planning segment.

Even though many pesticides have established acute and chronic toxicity values, actual direct toxicity due to water column pesticide concentrations is very difficult to assess in the environment. In addition, many other variables can play a role in aquatic life degradation (i.e. nutrients, turbidity, channel maintenance, etc.), with the potential impacts manifested as reduced aquatic vegetation, lower dissolved oxygen concentrations, reduced habitat for macroinvertebrate and fish communities, and loss of microscopic plant-life at the base of the food chain. However, there have been no aquatic life use impairments detected in the State water bodies attributed to water column pesticide concentrations.

Acute toxicity to aquatic life is much easier to detect, however it is still somewhat difficult to determine its source and overall impact to the waterbody. During the 1993-1995 reporting period, two fish kills related to pesticides occurred, neither of which were in the Delta ecoregion.

An over application of chlorpyrifos, an insecticide, caused a fish kill in a neighborhood lake. In another incident, cypermethrin, an insecticide, was spilled into a waterbody severely damaging the aquatic life in the system. In June 1999, chlorpyrifos leaked from a truck owned by a commercial pest control company in Garland County. This leak resulted in a fish kill in an unnamed tributary to Lake Hamilton. Another, more serious fish kill was reported in July, 2000. A fire at a Boone County farmers supply store resulted in the release of several pesticides including Pramitol, atrazine, propazine and chlorpyrifos into Crooked Creek. All of these incidences had relatively short term effects, as is normal with most acute toxicity events; however, they are examples of what can occur in areas of pesticide usage.

Table III-8: Sample Sites with Numerous Pesticide Occurrences

1999, 2000, and 2001 Sampling Events			
Station	**Segment**	**Location**	**No. of Detections[1]**
OUA178	2A	Oak Log Bayou near Watson	7(3)
OUA179	2A	Oak Bayou south of Pea Ridge	8(3)
OUA176	2A	Amos Bayou near Rohwer	9(3)
OUA175	2A	Macon Bayou near McArthur	10(3)
OUA174	2A	Amos Bayou Canal No. 43	10(3)
OUA13	2B	Bayou Bartholomew near Jones LA	15(6)
BYB03	2B	Bayou Bartholomew at Hwy. 54	11(6)
OUA148	2B	Melton's Creek south of Tarry	18(3)
OUA150	2B	Jack's Bayou south of Tamo	15(6)
OUA151	2B	Deep Bayou south of Grady	17(9)
BYB02	2B	Bayou Bartholomew at Hwy. 4	17(8)
OUA154	2B	Bayou Bartholomew near Portland	18(8)
OUA33	2B	Bayou Bartholomew near Ladd	7(5)
OUA149	2B	Cousart Bayou south of Tamo	11(6)
OUA152	2B	Cross Bayou southeast of Fresno	11
OUA147	2B	Bayou Imbeau southeast of Pine Bluff	9(2)
COC01	2B	Cut-Off Creek at Co. Rd. NE of Boydell	6(4)
OUA157	2B	Cutoff Creek east of Collins	6(3)
OUA146	2B	Tributary to Bayou Bart. Pine Bluff	6(2)
PMB01	3C	Plum Bayou near Tucker	6(2)
BGC02	4A	Big Creek at Hwy 49	12(6)
CPC01	4A	Big Cypress Creek at Hwy. 1	8(3)
LGB01	4A	LaGrue Bayou at Hwy 33	14(4)
WHI37	4A	Big Creek near Watkins Corner	24(6)
FRA28	5A	Fifteen Mile Bayou near Proctor	8(3)
FRA29	5A	Ten Mile Bayou near Edmondson	11(3)
FRA27	5A	Blackfish Bayou near Wildwood	14(6)
FRA36	5A	St. Francis River at Marked Tree	9(3)
FRA38	5A	Right Hand Chute near Riverdale	10(3)
FRA33	5A	Tyronza River near Tyronza	7(3)
FRA37	5A	Left Hand Chute near Lepanto	12(3)
FRA32	5B	Tyronza River near Earle	9(3)
LGR01	5B	L'Anguille River at Hwy 306	12(6)

1 (#) Number of detections of Molinate, Metalachlor and Bentazon.

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CHAPTER FIVE LAKES WATER QUALITY ASSESSMENT

Background

The size of Arkansas' surface water resource has been estimated to be three fourths of one million acres of flowing and impounded waters. Streams and rivers compose approximately one third of this total. The remaining one half million acres are divided between the large Corps of Engineers multi-purpose reservoirs and the small, usually specific-purpose lakes (including private ponds).

The Corps of Engineers reservoirs are multi-use, but most were constructed primarily for hydropower and flood control, and some primarily for navigation. A few are presently used for municipal water supply. All receive substantial recreational uses such as fishing, swimming, boating, camping, and related uses. The States' smaller lakes were normally constructed for a single purpose such as municipal water supply, but others were built for general recreation use and some were designed and managed for the primary purpose of public fishing. In the latter group, other recreational uses are permitted, unless they conflict with fishing, e.g., water skiing. Multiple uses are allowed on very few of the municipal water supply lakes; however, numerous uses are allowed on the industrial water supply impoundments.

Water quality data from the majority of Arkansas' 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. The 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 totaling 355,954 acres. The lakes are categorized into five groups by: (1) ecoregion; (2) the primary construction purpose; and (3) certain morphometric features such as size and average depth.

Table III-9 is a list of Arkansas' significant publicly owned lakes and selected characteristics of each. Figure III-3 is a map depicting the locations of ADEQ water quality monitoring sites on each lake. The number corresponds to the lake number in Table III-9; duplicate numbers indicate multiple sample sites on the same lake.

Table III-9: Significant Publicly-Owned Lakes

No	Lake	County	Acres	Avg. Depth	Water Shed[2]	W/A[3]	Eco Region[4]	Purpose[5]	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	2623	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	WRIGHT	SEBASTIAN	350	9	3.1	5.7	AV	A	B
28	FT. SMITH	CRAWFORD	416	28	73.0	112.3	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
31	SHEPHERD SPRINGS	CRAWFORD	552	31	68.0	78.8	BM	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

2 Watershed measurements indicate square miles.
3 W/A = Watershed (Acres)/Area of Lake
4 OM=Ouachita Mountains; BM=Boston Mountains; OH=Ozark Highlands; AV=Arkansas River Valley; GC=Gulf Coastal Plains; DL=Delta
5 W=Water Supply; F=Flood Control; H=Hydropower; A=Angling (Public Fishing) N=Navigation; R=Recreation

No	Lake	County	Acres	Avg. Depth	Water Shed[2]	W/A[3]	Eco Region[4]	Purpose[5]	Type
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
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
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	DESARC	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

No	Lake	County	Acres	Avg. Depth	Water Shed[2]	W/A[3]	Eco Region[4]	Purpose[5]	Type
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	355,954						

Lake Water Quality Assessments

Three lake water quality assessments have been completed on Arkansas significant publicly-owned lakes since 1989. The "Water Quality Assessment of Arkansas' Significant Publicly-Owned Lakes, Summer 1999" is the latest of these assessments and it outlines the current trophic status and water quality of each of the lakes. Water quality samples, metals, pesticides, dissolved oxygen and temperature profiles, and fecal coliform bacteria were collected from most of these lakes between mid-July and the end of August in 1989, 1994, and 1999. Sediment samples were collected in 1994, and plankton samples were collected in 1999. This is the only data that has been collected from most of the States' lakes, except for some of the Corps of Engineers lakes and some of the large municipal water supply lakes that are sampled annually.

Using lake morphology, ecoregion, and purpose of construction, all of the lakes were grouped in the following manner:

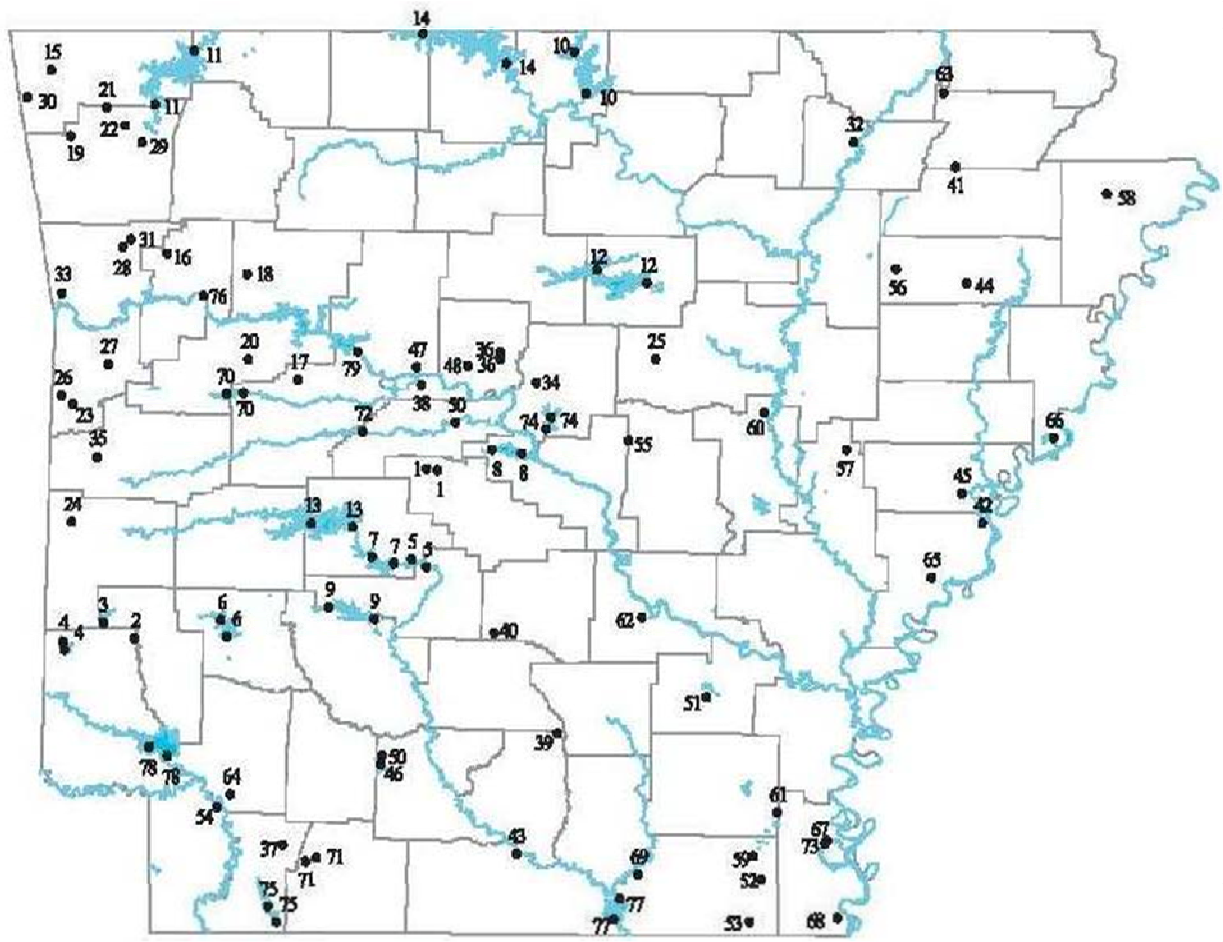
Type A

These are the larger lakes, usually of several thousand acres in size. They have average depths normally 30 to 60 feet and are located in the mountain areas of the State in the Ozark Highlands, Ouachita Mountains and Boston Mountains. The watersheds of most are forest dominated, and the primary purpose of most of these lakes is hydropower and/or flood control. The watershed to lake area ratio (W/A) is relatively large for these impoundments, but the large reservoir volume lengthens the water residence time.

Type B

These are the smaller lakes of the uplands or steeper terrains of the mountainous regions and are probably the most heterogeneous group of lakes. Most are 500 acres or less in size and are located in the Ozark Highlands, Ouachita Mountains and Boston Mountains. Several are located in the more mountainous areas of the Arkansas River Valley. Average depths range from 10 to 25 feet and watersheds are normally dominated by forest lands. The W/A ratios are normally high which results in a high flushing rate and low water retention time for these smaller lakes.

Figure III-3: Location of Arkansas' Significant Publicly-Owned Lakes



Type C

This group is composed of the smaller lakes of the lowlands or flat terrain areas. Sizes range from 300 to 1,000 acres with average depths of normally less than 10 feet. These lakes are located in the Arkansas River Valley, Gulf Coastal Plains and Delta ecoregions. The Delta lakes of this group are generally associated with the Crowley's Ridge region. Watersheds of these lakes include timberlands of both lowland hardwoods and pines, but some are broken by pasture land and small farms. These lakes have relatively small storage volumes due to shallow average depths and those with higher W/A ratios have high flushing rates.

Type D

These are small impoundments of the Delta area of the State, but include two similar type lakes from the large river alluvium of the Gulf Coastal Ecoregion. These type lakes are generally 200 to 500 acres in size with average depths of around five feet. This group includes several natural, oxbow cutoff lakes which have been modified by a water control structure to increase their isolation from the parent stream and maintain higher dry season water levels. These lakes are only occasionally flooded by the parent stream and generally have very small direct runoff watersheds. The other lakes of this type are man made, but they are almost totally isolated from their watershed by levees. Water levels are maintained through occasional pumping from adjacent waterways. Where watersheds exist that discharge directly to the oxbow lakes in this group, the runoff is primarily from row crop agriculture.

Type E

These are the large lowland lakes of the Delta, Gulf Coastal and the large alluvial areas of the Arkansas River Valley Ecoregion. They range from several thousand to over 30,000 acres in size, but average depth is usually less than 10 feet. This group also includes four large, oxbow cutoff lakes which have been substantially modified by construction of drainage ditches, levees and other water control structures. Watershed types include mixtures of intensive row crop agriculture, small farms and pastures (with increasing amounts of confined animal production) and timberlands.

Lake Water Quality Trends

A comparison of the trophic rankings for all of the lakes during the three surveys can be found in Table III-10. 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. Old Town Lake had the highest trophic index of all lakes. It had a chlorophyll a concentration of 123.40 ug/L, which was twice that of the next highest lake. Grand Lake had the second highest trophic index in 1999, as it did in 1989; however it was about half that of Old Town Lake. Lake Frierson's third highest trophic ranking in 1999 and second highest in 1994 was probably influenced by the excessive turbidity from suspended silt particles during both surveys. This resulted in low secchi disk transparencies, but was not related to the trophic status of the lake. The upper Blue Mountain Lake transect had the fourth highest trophic index in 1999. This was also caused by low secchi disk transparency related to suspended silt particles rather than plankton production. This transect was not sampled during the previous two surveys. Lake Mallard had the fifth highest trophic index in 1999 and 1994 and the third highest in 1989. It had the second highest chlorophyll a concentration in 1999. In the past, this lake was fertilized routinely for fisheries enhancement, which perhaps is the main reason for its high trophic rankings. The lowest trophic indices were from Type A and B lakes. Ninety three percent (93%) of the Type D lake stations and two-thirds of the Type E lake stations were in the upper one-third of all lake station trophic indices. Eight of the 10 lakes with the highest trophic rankings are located in the Delta ecoregion, one in the Gulf Coastal Plains and one in the Arkansas River Valley. The highest trophic indices were almost always comprised of the same lakes each year of the survey.

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.

The pH standard was only exceeded on a few occasions, mostly in the lakes with anoxic hypolimnions or in the more productive lakes of the Delta. Several lakes exceeded the temperature standard, but these violations were most likely due to the unusually hot ambient 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 facility.

Several lakes had hypolimnetic turbidity values above the 25 NTU standard and were probably caused by the settling of dead plankton organisms or the re-suspension of colloidal clay particles from inflows into the hypolimnion. Blue Mountain Lake and Lake Frierson have a history of elevated turbidity values most likely due to in-lake processes of wind action on shallow waters, soil types susceptible to colloidal suspensions, and/or disturbances in the watershed.

Lake Wilhelmina's fecal coliform count exceeded both the primary and secondary contact recreation criteria. This lake has a history of elevated bacteria counts, especially near the fish culture facility located in the lake. However, the bacteria being detected in Lake Wilhelmina is most likely not a fecal coliform bacterium since the only evident source of fecal contamination is from the fish production facility. The fecal coliform indicator is reported to be from the gut of warm-blooded animals. Fish are poikilotherms ("cold-blooded"). Some other bacteria were detected by the fecal coliform test. The in-lake fish production facility is most likely the source of these unidentified bacteria. The upper Lake Millwood site and Lake Calion values exceeded the primary contact recreation standard during the 1999 survey. These exceedances are probably short-term, event specific occurrences. Overall, fecal coliform concentrations were noticeably lower during the 1999 survey compared to the previous surveys.

An atypically high dissolved copper value was found in the hypolimnion of lower Lake Felsenthal in 1999. Both the acute and chronic standards were exceeded. The source is unknown. In general, there were only minimal and sporadic standards violations in the lakes surveyed, and many of these violations may be cyclic and related to local weather conditions.

Table III-10: Comparison of Trophic Rankings Between the 1989, 1994, and 1999 Surveys[6,7]

#	Name	Type	1999		1989		1994	
			Index	Rank	Index	Rank	Index	Rank
65	OLD TOWN	D	42.45	1	16.81	4	41.19	1
68	GRAND	E	24.86	2	11.35	6	26.32	2
41	FRIERSON	C	12.85	3	24.34	2	4.09	21
70	BLUE MT. (B)	E	12.01	4				
58	MALLARD	D	11.16	5	11.64	5	22.56	3
61	WALLACE	D	10.71	6	5.92	15	11.08	8
73	LOWER CHICOT	E	9.32	7	10.70	7	4.38	20
56	HOGUE	D	9.16	8	7.29	11	2.02	38
66	HORSESHOE	E	8.95	9	17.72	3	14.44	5
64	BOIS D' ARC	D	8.65	10				
70	BLUE MT (A)	E	7.99	11	4.57	21	1.11	49
68	UPPER CHICOT	E	6.72	12	10.04	8	13.70	6
64	ASHBAUGH	D	6.70	13	2.63	29	3.15	24
37	JUNE	C	6.05	14	6.20	14	12.81	7
62	PINE BLUFF	D	5.61	15	6.43	13		
52	WILSON	D	5.37	16	3.92	24	3.14	25
54	1ST OLD RIVER	D	5.11	17	8.96	10	7.24	15
75	ERLING (B)	E	4.90	18	3.40	27	7.45	14
39	TRICOUNTY	C	4.74	19	4.78	20	6.39	16
55	PICKTHORNE	D	4.20	20	1.73	41		
53	ENTERPRISE	D	4.09	21	2.57	25	3.06	26
45	BEAR CREEK	C	3.48	22	9.28	9	10.81	9
32	CHARLES	B	3.46	23	4.99	19	2.90	29
22	FAYETTEVILLE	B	3.30	24	1.80	39	0.65	54
60	DESARC	D	3.23	25	5.63	17	2.94	28
74	CONWAY (B)	E	3.06	26	4.27	22	7.86	12
79	DARDANELLE	E	3.05	27				
47	ATKINS	C	3.01	28	2.57	30	1.78	41
78	MILLWOOD (A)	E	2.79	29	2.19	34	1.54	42
42	STORM CREEK	C	2.78	30	5.64	16	7.84	13
74	CONWAY (A)	E	2.64	31	6.52	12	8.89	11
46	UP. WHITE OAK	C	2.24	32	3.40	26	3.00	27
51	CANE CREEK	C	2.10	33	0.98	54	3.66	22
29	SEQUOYAH	B	1.96	34	1.79	40		

6. Some lake stations were not sampled during certain years for various reasons.
7. U.S. Army Corps of Engineers data used to calculate trophic index.
(A) Lower Lake Station
(B) Upper Lake Station

#	Name	Type	1999		1989		1994	
			Index	Rank	Index	Rank	Index	Rank
23	BOBB KIDD	B	1.87	35	1.34	49	1.19	47
21	ELMDALE	B	1.81	36	0.70	59	2.03	37
30	SWEPCO	B	1.78	37	0.31	73	0.22	78
59	GRAMPUS	D	1.71	38	2.35	33	3.53	23
11	BEAVER (B)	A	1.49	39	0.46	69	0.80	51
75	ERLING (A)	E	1.42	40	2.09	36	4.64	18
15	CRYSTAL	B	1.40	41	0.68	61	0.25	75
43	CALION	C	1.35	42	1.48	47	2.57	33
38	BAILEY	C	1.34	43	2.52	31	4.90	17
24	WILHELMINA	B	1.33	44	2.06	37	1.30	46
78	MILLWOOD (B)	E	1.20	45	2.19	34	1.54	42
33	LEE CREEK	B	1.14	46	0.22	81		
77	FELSENTHAL (B)	E	1.13	47	5.54	18	2.32	34
40	COX CREEK	C	1.12	48	2.50	32		
14	BULL SHOALS (A)	A	1.02	50	0.11	94	0.08	93
16	SHORES	B	0.94	51	0.23	80	0.41	67
77	FELSENTHAL (A)	E	0.93	52	3.96	23	1.96	39
49	LO. WHITE OAK	C	0.87	53	1.56	45	1.41	44
27	NOLAN (Wright)	B	0.85	54	1.68	42		
50	HARRIS BRAKE	C	0.70	55	1.02	52	2.89	30
36	BREWER (A)	B	0.68	56	0.86	56	0.76	53
4	DEQUEEN (A)	A	0.65	57	0.39	72	0.32	72
44	POINSETT	C	0.57	58	1.60	44	0.47	62
25	BARNETT	B	0.56	59	0.26	77	2.29	35
26	SUGARLOAF	B	0.52	60	0.63	65	0.49	58
71	COLUMBIA (B)	E	0.46	61	1.80	38	2.62	31
69	GA. PACIFIC	E	0.46	62	1.66	43	2.25	36
5	CATHERINE (A)	A	0.44	63	0.70	60	1.33	45
71	COLUMBIA (A)	E	0.37	64	1.00	53	2.59	32
2	DIERKS	A	0.35	65	0.51	68	0.43	66
5	CATHERINE (B)	A	0.32	66	1.40	48	1.48	43
3	GILLHAM	A	0.31	67	0.74	58	0.41	68
19	WEDINGTON	B	0.29	68	0.16	86	0.22	77
34	BEAVER FORK	B	0.27	69	1.27	50	0.45	64
31	SHEPHERD SPGS	B	0.27	70	0.15	89	0.44	65
20	COVE	B	0.26	71	0.26	75	0.27	74
35	HINKLE	B	0.25	72	0.60	66	0.45	63
28	FT. SMITH	B	0.24	73	0.15	88	0.23	76

#	Name	Type	1999		1989		1994	
			Index	Rank	Index	Rank	Index	Rank
9	DEGRAY (B)	A	0.24	74	2.18	35	0.49	59
6	GREESON (B)	A	0.23	75	0.65	63	0.50	57
14	BULL SHOALS (B)	A	0.23	76	0.11	96	0.11	87
12	GREERS FERRY (B)	A	0.20	77	0.10	97	0.11	88
7	HAMILTON (B)	A	0.20	78	0.97	55	0.60	55
18	HORSEHEAD	B	0.17	79	0.20	84	0.48	60
1	WINONA (B)	A	0.15	80				
7	HAMILTON (A)	A	0.15	81	0.18	85	0.57	56
8	MAUMELLE (B)	A	0.13	82	1.06	51	0.38	71
6	GREESON (A)	A	0.13	83	0.59	67	0.13	83
8	MAUMELLE (A)	A	0.12	84	0.15	87	0.29	73
17	SPRING	B	0.11	85	0.24	79	0.38	70
9	DEGRAY (A)	A	0.11	86	0.27	74	0.11	86
12	GREERS FERRY (A)	A	0.11	87	0.25	78	0.13	84
1	WINONA (A)	A	0.08	88	0.11	92	0.2	80
13	OUACHITA (C)	A	0.08	89	0.26	76	0.22	79
13	OUACHITA (A)	A	0.07	90	0.15	90	0.08	92
11	BEAVER (A)	A	0.05	91	0.22	82	0.09	90
10	NORFORK (A)	A	0.03	92	0.12	91	0.09	89
10	NORFORK (B)	A	0.03	93	0.10	98	0.11	85
57	GREENLEE	D			288.74	1	15.64	4
48	OVERCUP	C			3.27	28	4.63	19
72	NIMROD	E			1.52	46	0.88	50

Restoration Efforts

The Natural Resources Conservation Service (NRCS) initiated a Millwood Lake Watershed Demonstration Project in 1990 to encourage accelerated adoption of best management practices (BMP) and technologies that cost effectively reduce impacts from confined animal manure disposal and associated activities on ground and surface water that result in documented water quality benefits. This watershed was adopted as a priority watershed by the NRCS for BMP implementation. In addition, this watershed was listed as a priority watershed by the State Unified Watershed Assessment group in 1999 enabling additional nonpoint source funds to be utilized in the watershed.

In 1999, a group of concerned citizens formed the Beaver Lake Watershed Partnership. This group of citizens, along with the help of local, state, and federal governments, and private and academic entities, has begun an initiative to preserve and enhance the water quality in Beaver Lake. The main goals of this group are to educate the local citizens and watershed land owners about the effects of pollution on the lake; to develop a watershed management plan; and to solicit the membership of those businesses and citizens within the watershed.

In addition to these 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 Soil and Water Conservation Commission continually initiates demonstration projects for the control of nonpoint source pollution.

Impaired Uses of Lakes

None of the designated uses, i.e., public, agriculture or industrial water supply; propagation of fish and wildlife; primary and secondary contact uses; and navigation, have been eliminated or are impaired in any of the lakes. Similarly, the fishable/swimmable goals of the Clean Water Act have been attained in all lakes. However, fish consumption was not supported in some lakes because of fish consumption advisories which have been issued for waters where fish tissue contamination due to mercury have exceeded the Federal Food and Drug Administration's action levels (See Part III, Chapter Seven).

The fish consumption use is not supported in lakes Felsenthal and Columbia. These lakes total 16,950 acres (Table III-11). 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, Table III-12 (page 88), for additional details of the current health advisories on Arkansas publicly-owned lakes.

Table III-11: Lakes Use Support

Degree of Use Support	Assessment Category		Total Assessed (acres)
	Evaluated	Monitored	
Size Fully Supporting		339,004	339,004
Size Not Supporting		16,950	16,950
Total Assessed (acres)		355,954	355,954

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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 WWII, 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). Estimates of the loss of bottom land hardwood forest in eastern Arkansas since 1957 and projections of losses through 1995 are given in the 1996 305B.

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 Soil and Water Conservation Commission (ASWCC)."

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, ASWCC, 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 (AFC), 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’ water resources and wetlands.” Protection and preservation of Arkansas’ 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. The MAWPT expects to have them completed, printed and available on their website by 2005. 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 EPA 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 EPA 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's 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.

The MAWPT also received funding to update and further delineate the Ecoregions of Arkansas, working with Mr. James Omernik and other EPA scientist as well as a large team of State and federal resource managers. This mapping is based on ecosystems, aquatic habitats and aquatic biota, land use, soils, and other physiographic data. Its development will help with the management of all ecosystems, including wetlands.

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 Soil and Water Conservation 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.

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

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' 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 was confined primarily to waters in Arkansas which 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-12 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-12: Fish Consumption Advisories in Place as of January, 2000

Waterbody /Reach No.	Type	Size Affected	Type Fish Consumption Restricted				Pollutant of Concern
			No Consumption		Lim. Consumption		
			Gen Pop	High Risk	Gen Pop	High Risk	
Bayou Bartholomew 08040205–002 08040205–012	River	~48 miles		X	X		Mercury
	• 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.						
Bayou Meto 08020402–007	Stream	~48 miles	X	X			Dioxin
	• Consumption of fish from this area is not recommended due to dioxin contamination. This applies to all risk groups.						
Tributary of Big Cr 11140203–XXX	Stream	~2 miles	X	X			PCBs
	This stream is closed to fishing due to polychlorinated biphenyl contamination.						
Big Johnson Lake[1] (Calhoun County)	Lake	80 acres		X	X		Mercury
	• 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.						
Champagnolle Cr. 08040201–003 L. Champagnolle 08040201–XXX	Stream	~20 miles			X	X	Mercury
	• 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.						
Columbia Lake	Lake	2,950 acres		X	X		Mercury
	• 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.						
Cove Creek Lake (Perry County)	Lake	46 acres			X	X	Mercury
	• 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.						
Cut-Off Creek 08040205–007	Stream	16.8 miles		X	X		Mercury
	• 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.						
Dorcheat Bayou 11140203–020 11140203–022 11140203–024 11140203–026	Stream	50.6 miles		X	X		Mercury
	• 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.						

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) which 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 exceedance 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' Source Water Protection Program (SWAP) is an EPA-mandated program to assess all public water systems in the State for vulnerability to contamination. Preparation of the SWAP was required by the 1996 amendments to the Safe Drinking Water Act. The Engineering Division at the Arkansas Department of Health (ADH) was responsible for the development of the SWAP plan and for conducting the vulnerability assessments. Arkansas SWAP was approved by EPA Region 6 in November, 1999 and the assessment was completed in May, 2003.

Vulnerability assessment is a multi-step process consisting of source location, delineation of source water assessment areas, mapping of potential contaminant locations, and a susceptibility analysis produced using a Geographical Information System. The purpose of the SWAP was to establish a viable method for assessing vulnerability and producing accurate, maps intended to be used as the basis for source water protection planning by public water systems, their customers, and their 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 the most critical problems within a watershed. The ADH is now providing technical assistance for the development of source water protection plans. 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 EPA.

As a result of several lawsuits concerning past 303(d)/TMDL processes, EPA 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 EPA 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 (303d) 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 list of impaired waterbody segments is divided into five tables. 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 60 stream segments totaling 1009.9 stream miles, and 10 lakes totaling 5,530+ acres.

There are 72 stream segments, approximately 1366 stream miles, listed in Category 5b. The waters listed in this category are currently not meeting water quality standards. However, proposed changes to the water quality standards outlined in Regulation No. 2 and/or the reclassification of some stream types will result in the de-listing of most of these stream segments. An example is the classification of certain Delta streams as Channel Altered Delta streams; another is the use of *E. coli* concentrations to assess primary contact recreation attainment instead of using fecal coliform bacteria concentrations.

Category 5c contains those stream segments where water quality data indicates impairment, but the data is questionable because of quality control/quality assurance issues. There are 24 stream segments totaling approximately 310 stream miles listed in this category. The majority of these segments are listed because of some type of metals contamination. Ultra-clean sampling and analysis techniques will be used to determine the accuracy of these listings. Other listings in this category are for dissolved oxygen and/or pH violations. Field meter accuracy and quality assurance will be verified to determine the accuracy of these listings.

The stream segments listed in Category 5d are those that need additional field verification in order to determine the accuracy of the assessment. There are currently 69 stream segments totaling approximately 1475 stream miles listed in this category. The majority of the listings are for the exceedance of either the dissolved oxygen standard, or the primary contact recreation standard assessed using fecal coliform bacteria data. Additional sampling using *E. coli* bacteria will help to better assess the primary contact recreation standard in these waters. Aquatic life sampling to determine the biological health of these systems will help determine the appropriateness of the current standards and the aquatic life use attainment of the stream segment.

Fifteen stream segments, approximately 291 stream miles, are listed in Category 5e. These are stream segments where water quality standards are routinely exceeded, but the magnitude of the exceedances is not severe. For example: the total dissolved solids (TDS) standard may be 200 mg/L. The assessment criteria indicates that if more than ten percent of the samples collected exceed the standard, then the segment is to be listed as impaired. In this example, five out of twelve samples have TDS values above 200 mg/L. According to the assessment criteria, the segment is impaired. However, four of the values that exceeded the standard have concentrations between 201 mg/L and 210 mg/L. This small magnitude of exceedance is probably not impairing a designated use and thus, the segment should not be listed as impaired.

To date, 62 TMDLs have been developed for Arkansas' waterbodies. Another 20 TMDLs are currently being developed and approximately 24 are in the planning stages. There are also nine lakes totaling 21,950 acres on this list with established TMDLs.

Note: The 2004 303(d) list contained in this report was published and released for formal public comment in February 2005. It is anticipated that the list will be formally submitted to the U. S. Environmental Protection Agency, Region 6 for approval in late summer, 2005.

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
RE = resource extraction (mining; oil and gas extraction)
UN = unknown

IP = industrial point source
MP = municipal point source
RC = road construction/maintenance
HP = hydropower

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' Impaired Waterbodies Without Completed TMDLs (Categories 5a-e)

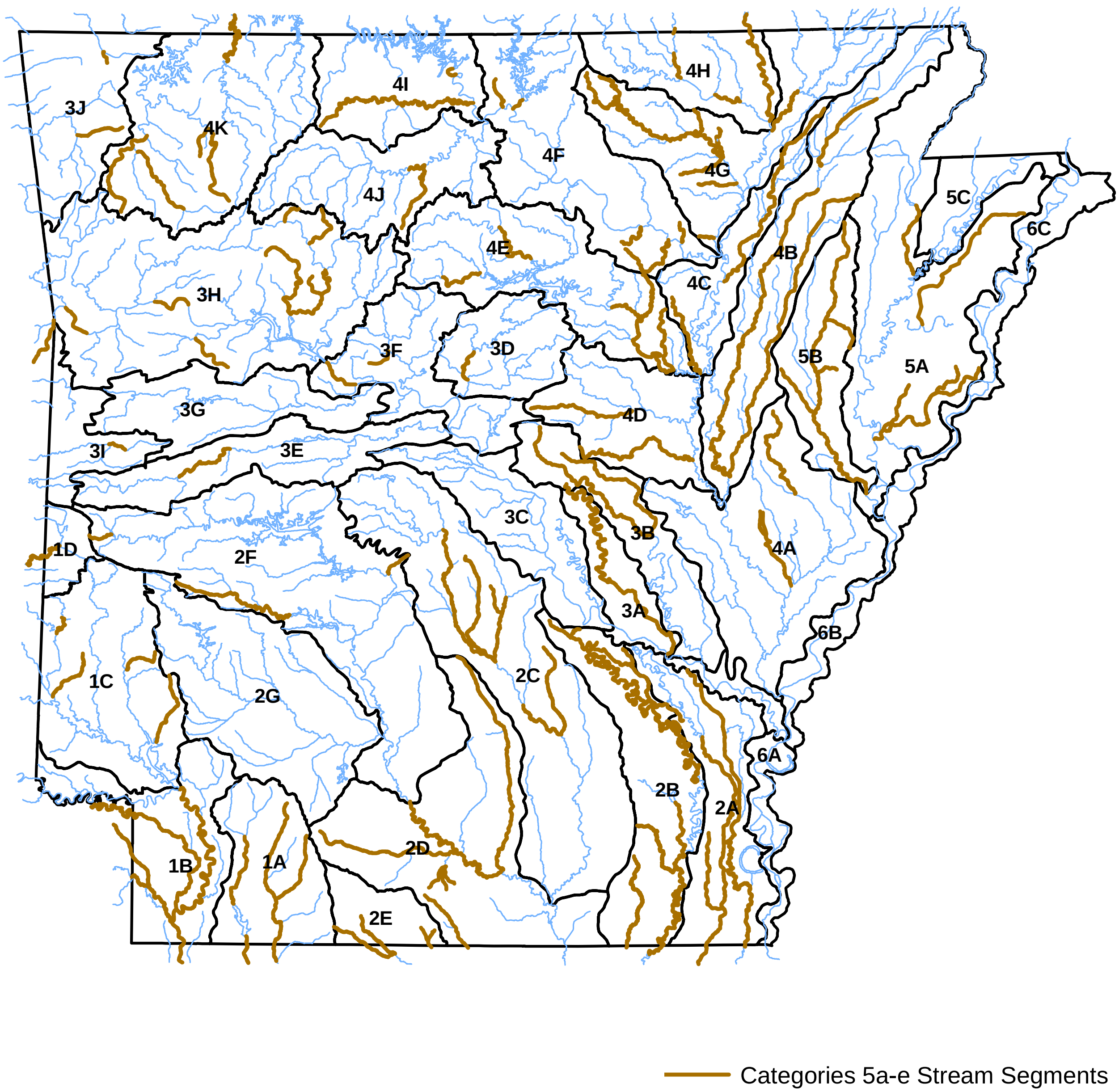


Table IV-1: Water Quality Limited Waterbodies (Category 5a) – 303(d) List

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
Bodcau Creek	11140205	-006	1A	22.4	RED27	M		N					UN				SI				5a	L
Bodcau Creek	11140205	-002	1A	6.0		E		N					UN				SI				5a	L
McKinney Bayou	11140201	-014	1B	21.6	RED55	M					N	N	UN				TDS				5a	M
McKinney Bayou	11140201	-012	1B	23.1	RED54	M					N	N	UN				TDS				5a	M
Red River	11140201	-011	1B	15.2	RED46	M					N	N	UN				TDS				5a	M
Red River	11140201	-007	1B	40.1	RED45	M					N	N	UN				TDS				5a	M
Red River	11140201	-005	1B	12.0		E					N	N	UN				TDS				5a	M
Red River	11140201	-004	1B	4.0		E					N	N	UN				TDS				5a	M
Red River	11140201	-003	1B	15.5	RED09	M					N	N	UN				TDS				5a	M
Sulphur River	11140302	-008	1B	0.8		E		N					UN				SI				5a	L
Sulphur River	11140302	-006	1B	6.5	RED05	M		N					UN				SI				5a	L
Sulphur River	11140302	-004	1B	0.7		E		N					UN				SI				5a	L
Days Creek	11140302	-003	1B	11.0	RED04A	M					N		MP				NO_3				5a	H
Sulphur River	11140302	-002	1B	8.5		E		N					UN				SI				5a	L
Sulphur River	11140302	-001	1B	6.3		E		N					UN				SI				5a	L
Rolling Fork	11140109	-919	1C	12.8	RED58	M		N					IP	IP	IP		NO_3	TP	Cu		5a	H
Mine Creek	11140109	-033	1C	22.1	RED48B+	M		N					IP				Cu				5a	M
Bear Creek	11140109	-025	1C	17.3	RED33	M					N		MP				NO_3				5a	H
Big Bayou	8050001	-022	2A	27.1	BGB01+	M		N					AG	AG			SI	CL			5a	L
Boeuf River	8050001	-019	2A	58.1	BFR01	M		N					AG	AG			SI	CL			5a	L
Boeuf River	8050001	-018	2A	49.4	OUA15A	M		N					AG	AG			SI	CL			5a	L
Oak Bayou	8050002	-010	2A	48.4	OUA179	M		N			N	N	AG	AG	AG		SI	CL	TDS		5a	L
Macon Bayou	8050002	-006	2A	38.6		E		N					AG				SI				5a	L
Macon Bayou	8050002	-003	2A	80.5	BYM02	M		N					AG				SI				5a	L
Big Creek	8040203	-904	2C	10.0	OUA18	M		N					MP	UN			OE	SI			5a	L
Salt Creek	8040201	-806	2D	8.0	OUA137D	M		N					IP				Cu				5a	H
Flat Creek	8040201	-706	2D	16.0	OUA137C	M		N					IP	IP			Cu	Zn			5a	H
Elcc Trib.	8040201	-606	2D	8.5	OUA137A&B	M		N			N		IP	IP	IP		NO_3	Cu	Zn		5a	H
Moro Creek	8040201	-001L	2D	12.0	OUA28	M		N					UN				SI				5a	L
Moro Creek	8040201	-001U	2D	57.9		E		N					UN				SI				5a	L
Big Cornie Creek	8040206	-015	2E	15.0	OUA02	M		N					RE				Zn				5a	L
Cove Creek	8040101	-901	2F	9.6	OUA159	M		N					RE				Cu				5a	M
S. Fork Caddo	8040102	-023	2F	16.6	OUA44	M		N					RE	RE			Cu	Zn			5a	H
Cadron Creek	11110205	-012	3D	9.5		E		N					UN				SI				5a	M
Cadron Creek	11110205	-011	3D	2.2	CCR01	M		N					UN				SI				5a	M
White Oak Creek	11110203	-927	3F	10.0	ARK53	M		N					UN				SI				5a	L
Arkansas River	11110203	-031L	3F	9.4	ARK32	M					N	N	UN				TDS				5a	M
Arkansas River	11110203	031U	3F	2.0	ARK32	M		N					HP				DO				5a	M
Arkansas River	11110104	-001	3H	11.0	ARK38	M					N	N	UN				TDS				5a	M
Arkansas River	11110201	-001	3H	12.4	ARK33	M					N	N	UN				TDS				5a	M
Poteau River	11110105	-001	3I	2.0	ARK14	M		N					SE				SI				5a	M
Poteau River	11110105	031L	3I	6.6	ARK55	M		N					SE	MP	IP		SI	NO3	TP		5a	M
Bayou DeView	8020302	-009	4B	20.3	WHI26	M		N					MP	MP	MP	MP	Al	Cu	Pb	Zn	5a	M
Hicks Creek	11010004	-015	4F	9.1	WHI65	M		N					MP				Cu				5a	M
Norfork River	11010006	-001	4F	4.2	USGS	M		N					HP				DO				5a	H
Caney Creek	11010012	-016	4G	11.6	WHI143Q&R	M			N				AG				PA				5a	H
Mill Creek	11010012	-015	4G	9.9	WHI143N	M			N				AG				PA				5a	H
Reed's Creek	11010012	-014	4G	15.0	RDC01	M			N				AG				PA				5a	H
Strawberry R.	11010012	-011	4G	20.4	SBR01	M		N	N				SE	AG			SI	PA			5a	H
L. Strawberry River	11010012	-010	4G	16.0	WHI0143H+	M		N	N				SE	AG			SI	PA			5a	H

Table IV-1 (cont.): Water Quality Limited Waterbodies (Category 5a) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	ASSESS	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
Strawberry R.	11010012	-009	4G	28.4	SBR02	M		N	N				SE	AG			SI	PA			5a	H
Strawberry R.	11010012	-008	4G	8.4		E		N	N				SE	AG			SI	PA			5a	H
Strawberry R.	11010012	-006	4G	19.0	WHI24	M		N					SE				SI				5a	H
Strawberry R.	11010012	-005	4G	0.7		E		N					SE				SI				5a	H
Strawberry R.	11010012	-004	4G	0.3		E		N					SE				SI				5a	H
Cooper Creek	11010012	-003	4G	11.8	WHI143S	M			N				AG				PA				5a	H
Crooked Creek	11010003	-048	4I	31.7	WHI48A	M		N					RE				Temp				5a	M
White River	11010003	002U	4I	3.0	USGS	M		N					HP				DO				5a	H
West Fork	11010001	-024	4K	27.2	WHI51	M		N					SE				SI				5a	H
White River	11010001	-023	4K	6.2	WHI52	M		N				N	SE				SI				5a	H

Table IV-1 (cont.): Water Quality Limited Waterbodies (Category 5a) – 303(d) List

LAKE NAME	HUC	LAKE TYPE	PLNG SEG	ACRES	COUNTY	ASSESS	FISH COMSUMP	AQUATIC LIFE	PRIMARY CONTACT	SECONDARY CONTACT	DRINKING WATER	AGRI & INDUSTRY	MAJOR SOURCE	MAJOR CAUSE	STATUS	TMDL DATE
June	11140203	C	1A	60	Lafayette	M	S	N	S	S	S	S	RE	CL	5a	2006
First Old River	11140201	D	1B	200	Miller	M	S	N	S	S	S	S	UN	NU	5a	2006
Wilhelmina	11140108	C	1D	200	Polk	M	S	S	N	N	S	S	UN	PA	5a	2006
Grand	8050002	E	2A	1400	Chicot	M	S	N	S	S	S	S	UN	NU	5a	2006
Calion	8040201	C	2D	510	Union	M	S	N	S	S	S	S	RE	CL	5a	2006
Horseshoe	8020203	E	4A	1200	Crittenden	M	S	N	S	S	S	S	UN	NU	5a	2006
Frierson	8020302	C	4B	335	Greene	M	S	N	S	S	S	S	UN	SI	5a	2006
Old Town	8020302	D	5A	900	Phillips	M	S	N	S	S	S	S	UN	NU	5a	2006
Bear Creek	8020205	C	5B	625	Lee	M	S	N	S	S	S	S	UN	NU	5a	2006
Mallard	8050002	D	5C	300	Mississippi	M	S	N	S	S	S	S	UN	NU	5a	2006

Table IV-2: Water Quality Limited Waterbodies (Category 5b) – 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
Big Creek	11140203	-023	1A	21.8	BIG01	M						N	MP	MP	MP		CL	SO4	TDS		5b	L
Dorcheat Bayou	11140203	-022	1A	8.4	RED15A	M						N	UN				SO4				5b	L
Dorcheat Bayou	11140203	-020	1A	11.9		E						N	UN				SO4				5b	L
Mine Creek	11140109	-033	1C	22.1	RED48B+	M					N		IP				SO4				5b	L
Chemin-A-Haut Cr	8040205	-907	2B	30.5	OUA12	M			N				UN				PA				5b	L
B. Bartholomew	8040205	-013	2B	33.9	BYB03	M						N	AG	AG			CL	TDS			5b	L
B. Bartholomew	8040205	-002	2B	17.9	OUA154	M						N	UN				CL				5b	L
B. Bartholomew	8040205	-001	2B	60.1	OUA13	M						N	UN				CL				5b	L
B. Bartholomew	8040205	012U	2B	82.7	BYB02	M						N	AG	AG			CL	TDS			5b	L
Saline River	8040203	-010	2C	29.8	OUA26&41	M						N	RE	RE			TDS	SO4			5b	L
Saline River	8040203	-009	2C	15.6		E						N	RE				TDS				5b	L
Lost Creek	8040203	-008	2C	33.5		E						N	RE				TDS				5b	L
Saline River	8040203	-007	2C	3.8	OUA42	M						N	RE				TDS				5b	L
Saline River	8040203	-006	2C	17.5	OUA118	M						N	RE	RE			TDS	SO4			5b	L
Bayou De L'outre	8040202	-008	2D	10.6		E						N	RE	RE			TDS	SO4			5b	L
Bayou De L'outre	8040202	-007	2D	6.9		E						N	RE	RE			TDS	SO4			5b	L
Bayou De L'outre	8040202	-006	2D	32.4	OUA05	M						N	RE	RE			TDS	SO4			5b	L
Walker Branch	8040206	-916	2E	3.0		E						N	RE				SO4				5b	L
Little Cornie Bayou	8040206	-816	2E	3.0		E						N	RE				SO4				5b	L
Little Cornie Bayou	8040206	-716	2E	5.0		E						N	RE				SO4				5b	L
Little Cornie Creek	8040206	-016	2E	18.0		E						N	RE				SO4				5b	L
Big Cornie Creek	8040206	-015	2E	15.0	OUA02	M						N	RE				SO4				5b	L
Wabbaseka Bayou	8020401	-003	3A	101.7	WSB01	M		N					AG				SI				5b	L
Cache River	8020302	-032	4B	11.4		E		N					AG				SI				5b	L
Cache River	8020302	-031	4B	3.4		E		N					AG				SI				5b	L
Cache River	8020302	-029	4B	3.9		E		N					AG				SI				5b	L
Cache River	8020302	-028	4B	5.9	CHR04	M		N					AG				SI				5b	L
Cache River	8020302	-027	4B	3.9		E		N					AG				SI				5b	L
Cache River	8020302	-021	4B	18.4		E		N					AG				SI				5b	L
Cache River	8020302	-020	4B	22.6	CHR03	M		N					AG				SI				5b	L
Cache River	8020302	-019	4B	13.7		E		N					AG				SI				5b	L
Cache River	8020302	-018	4B	25.0	CHR02	M		N					AG				SI				5b	L
Cache River	8020302	-017	4B	15.8		E		N	N				AG	AG			SI	PA			5b	L
Cache River	8020302	-016	4B	21.8	WHI32	M		N	N				AG	AG			SI	PA			5b	L
Bayou DeView	8020302	-009	4B	20.3	WHI26	M		N					AG				SI				5b	L
Bayou DeView	8020302	-007	4B	18.2		E		N					AG				SI				5b	L
Bayou DeView	8020302	-006	4B	10.2		E		N					AG				SI				5b	L
Bayou DeView	8020302	-005	4B	8.6		E		N					AG				SI				5b	L
Bayou DeView	8020302	-004	4B	21.2	BDV02	M		N					AG				SI				5b	L
Bayou DeView	8020302	-003	4B	7.1		E			N				AG				PA				5b	L
Bayou DeView	8020302	-002	4B	13.7	WHI33	M			N				AG				PA				5b	L
Glaise Creek	11010013	-021	4C	30.1	GSC01	M			N				AG				PA				5b	L
Village Creek	11010013	-014	4C	22.8		E		N					AG				SI				5b	L
Village Creek	11010013	-012	4C	7.4	VGC02	M		N					AG				SI				5b	L
Village Creek	11010013	-008	4C	13.0		E		N					AG				SI				5b	L
Village Creek	11010013	-007	4C	1.2		E		N					AG				SI				5b	L
Village Creek	11010013	-006	4C	25.2	VGC01&03	M		N					AG				SI				5b	L

Table IV-2 (cont.): Water Quality Limited Waterbodies (Category 5b) – 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
Cypress Bayou	8020301	-012	4D	17.5		E			N				AG				PA				5b	L
Cypress Bayou	8020301	-011	4D	9.5		E			N				AG				PA				5b	L
Cypress Bayou	8020301	-010	4D	5.0	CPB01	M			N				AG				PA				5b	L
S. F. Little Red River	11010014	-038	4E	14.7	SRR01&02	M			N				UN				PA				5b	L
Little Red River	11010014	-012	4E	8.0		E			N				UN				PA				5b	L
Little Red River	11010014	-010	4E	2.9		E			N				UN				PA				5b	L
Ten Mile Creek	11010014	-009	4E	18.6	TMC01	M		N	N				SE	UN			SI	PA			5b	L
Little Red River	11010014	-008	4E	9.0		E			N				UN				PA				5b	L
Little Red River	11010014	-007	4E	21.4	WHI59	M			N				UN				PA				5b	L
Overflow Creek	11010014	-006	4E	21.7	OFC01	M		N	N				AG	AG			SI	PA			5b	L
Overflow Creek	11010014	-004	4E	0.6		E		N	N				AG	AG			SI	PA			5b	L
Salado Creek	11010004	-012	4F	27.4	WHI166	M			N				AG				PA				5b	L
Big Creek	11010014	-018	4F	9.4	WHI164	M			N				AG				PA				5b	L
Greenbrier Creek	11010014	-017	4F	10.6	WHI167	M			N				AG				PA				5b	L
Data Creek	11010012	-902	4G	21.8	WHI165	M			N				AG				PA				5b	L
Bear Creek	11010005	-026	4J	23.9	BRK01+	M						N	MP				TDS				5b	L
War Eagle Creek	11010001	-060	4K	28.3		E					N	N	MP	MP	MP		CL	SO4	TDS		5b	L
Holman Creek	11010001	-059	4K	9.1	WHI70	M					N	N	MP	MP	MP		CL	SO4	TDS		5b	L
Kings River	11010001	-037	4K	19.1	WHI09A	M						N	MP				TDS				5b	L
West Fork	11010001	-024	4K	27.2	WHI51	M		N				N	UN				SO4				5b	L
Tyronza River	8020203	-012	5A	50.0	FRA33	M		N					AG				SI				5b	L
Blackfish Bayou	8020203	-007	5A	16.1	FRA27	M		N					AG				SI				5b	L
Fifteen Mile Bayou	8020203	-006	5A	38.4	FRA28	M		N					AG				SI				5b	L
Blackfish Bayou	8020203	-005	5A	2.6		E		N					AG				SI				5b	L
Blackfish Bayou	8020203	-003	5A	2.4		E		N					AG				SI				5b	L

Table IV-3: Water Quality Limited Waterbodies (Category 5c) – 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	-026	1A	23.3	BDT02	M		N					UN				pH				5c	M
Dorcheat Bayou	11140203	-024	1A	7.0		E		N					UN				pH				5c	M
Dorcheat Bayou	11140203	-022	1A	8.4	RED15A	M		N					UN				pH				5c	M
Dorcheat Bayou	11140203	-020	1A	11.9		E		N					UN				pH				5c	M
Bodcau Creek	11140205	-006	1A	22.4	RED27	M		N					UN				pH				5c	M
Bodcau Creek	11140205	-002	1A	6.0		E		N					UN				pH				5c	M
Mine Creek	11140109	-033	1C	22.1	RED48B+	M		N					IP				Zn				5c	M
Big Creek	8040203	-904	2C	10.0	OUA18	M		N					MP				Pb				5c	M
Hurricane Creek	8040203	-004	2C	19.5	OUA31	M		N					UN				DO				5c	M
Big Creek	8040204	-005	2C	28.9	OUA43	M		N					UN				pH				5c	M
Bayou De L'outre	8040202	-008	2D	10.6		E		N					RE	RE	RE		Cu	Pb	Zn		5c	M
Bayou De L'outre	8040202	-007	2D	6.9		E		N					RE	RE	RE		Cu	Pb	Zn		5c	M
Bayou De L'outre	8040202	-006	2D	32.4	OUA05	M		N					RE	RE	RE		Cu	Pb	Zn		5c	M
Walker Branch	8040206	-916	2E	3.0		E		N					RE				Zn				5c	M
Little Cornie	8040206	-816	2E	3.0		E		N					RE				Zn				5c	M
Little Cornie	8040206	-716	2E	5.0		E		N					RE				Zn				5c	M
Little Cornie	8040206	-016	2E	18.0		E		N					RE				Zn				5c	M
Cove Creek	8040101	901	2F	9.6	OUA159	M		N					RE	RE			pH	Zn			5c	M
Caddo River	8040102	-019	2F	7.7		E		N					UN	UN			Zn	Cu			5c	M
Caddo River	8040102	-018	2F	4.1		E		N					UN	UN			Zn	Cu			5c	M
Caddo River	8040102	-016	2F	13.5	OUA23	M		N					UN	Un			Cu	Zn			5c	M
Poteau River	11110105	031L	3I	6.6	ARK55	M		N					IP	MP			Cu	Zn			5c	M
Buffalo River	11010005	-005	4J	6.9	WHI49A	M		N					UN				DO				5c	M
St. Francis River	8020203	-014	5A	22.8	FRA08	M		N					UN				DO				5c	M

Table IV-4: 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
Bodcau Creek	11140205	-006	1A	22.4	RED27	M		N					UN				Zn				5d	M
Bodcau Creek	11140205	-002	1A	6.0		E		N					UN				Zn				5d	M
McKinney Bayou	11140201	-014	1B	21.6	RED55	M					N	N	UN				SO4				5d	M
McKinney Bayou	11140201	-012	1B	23.1	RED54	M					N	N	UN				SO4				5d	M
Mine Creek	11140109	-033	1C	22.1	RED48B+	M			N				IP				PA				5d	M
Holly Creek	11140109	-013	1C	12.7	RED34A&B	M			N				MP	IP			PA				5d	M
Big Bayou	8050001	-022	2A	27.1	BGB01+	M		N					AG	AG			TDS	SO4			5d	M
Beouf River	8050001	-019	2A	58.1	BFR01	M		N					AG	AG			TDS	SO4			5d	M
Beouf River	8050001	-018	2A	49.4	OUA15A	M		N					AG	AG			TDS	SO4			5d	M
Cross Bayou	8040205	-905	2B	2.4	OUA152	M			N				UN				PA				5d	M
Jack's Bayou	8040205	-904	2B	6.0	OUA150	M			N				UN				PA				5d	M
Melton's Creek	8040205	-903	2B	8.7	OUA160	M			N				UN				PA				5d	M
Harding Creek	8040205	-902	2B	4.6	OUA145	M				N			UR				PA				5d	M
Bearhouse Creek	8040205	-901	2B	24.4	OUA155	M			N				UN				PA				5d	M
B. Bartholomew	8040205	-013	2B	33.9	BYB03	M			N				AG				PA				5d	M
Cutoff Creek	8040205	-007	2B	16.8	COC01	M		N					UN				SI				5d	M
B. Bartholomew	8040205	-006	2B	82.3	OUA33	M		N					AG				DO				5d	M
Deep Bayou	8040205	-005	2B	28.9	OUA151	M			N				AG				PA				5d	M
B. Bartholomew	8040205	-002	2B	17.9	OUA154	M		N					AG				DO				5d	M
B. Bartholomew	8040205	012U	2B	82.7	BYB02	M		N					AG				DO				5d	M
Big Creek	8040204	-005	2C	28.9	OUA43	M		N					UN				SI				5d	M
Smackover Creek	8040201	-007	2D	29.1		E		N					RE				Zn				5d	M
Smackover Creek	8040201	-006	2D	14.8	OUA27	M		N					RE				Zn				5d	M
Ouachita River	8040201	-005	2D	34.2	OUA37	M		N					UN	UN			Cu	Zn			5d	M
Ouachita River	8040202	-004	2D	28.9	OUA124B	M		N					UN				Zn				5d	M
Ouachita River	8040202	-002	2D	4.0	OUA08B	M		N					UN				Zn				5d	M
Prairie Creek	8040101	-048	2F	10.0	OUA40	M		N					UN				SI				5d	M
Wabbaseka Bayou	8020401	-003	3A	101.7	WSB01	M		N					UN				DO				5d	M
Bayou Meto	8020402	-007	3B	65.7	ARK60,50	M		N					IP	UN			Pb	DO			5d	M
Bayou Two Prairie	8020402	-006	3B	44.7	ARK97	M		N					UN				DO				5d	M
Walnut Creek	11110202	-902	3H	5.1	ARK125	M			N				UN				PA				5d	M
Mill Creek	11110202	-901	3H	8.6	ARK110	M			N				AG				PA				5d	M
Short Mountain Cr	11110202	-043	3H	14.9	ARK11B	M		N					MP				Cu				5d	M
Little Piney Creek	11110202	-025	3H	27.2	ARK126	M			N				UN				PA				5d	M
Little Piney Creek	11110202	-024	3H	6.2	ARK104	M			N				AG				PA				5d	M
Hurricane Creek	11110202	-022	3H	15.4	ARK119	M			N				UN				PA				5d	M
Big Piney Creek	11110202	-018	3H	5.8	ARK105	M			N				AG				PA				5d	M
Town Branch	11110103	-901	3J	3.0	ARK56	M		N					MP				TP				5d	M
Clear Creek	11110103	-029	3J	13.5	ARK10C	M			N				UR				PA				5d	M
Boat Gunwale Slash	8020304	-914	4A	5.0	WHI74	M		N					AG				DO				5d	M
Prairie Cypress	8020304	-014	4A	26.1	WHI73	M		N					AG				DO				5d	M
Big Creek	8020304	-010	4A	34.3	BGC03	M						N	AG	AG			CL	TDS			5d	M
Cache River	8020302	-032	4B	11.4		E		N					AG				Pb				5d	M
Cache River	8020302	-031	4B	3.4		E		N					AG				Pb				5d	M
Cache River	8020302	-029	4B	3.9		E		N					AG				Pb				5d	M
Cache River	8020302	-028	4B	5.9	CHR04	M		N					AG				Pb				5d	M
Cache River	8020302	-027	4B	3.9		E		N					AG				Pb				5d	M
Cache River	8020302	-021	4B	18.4		E		N					AG				Pb				5d	M
Cache River	8020302	-020	4B	22.6	CHR03	M		N					AG				Pb				5d	M

Table IV-4 (cont.): 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
Village Creek	11010013	-008	4C	13.0		E		N					AG				DO				5d	M
Village Creek	11010013	-007	4C	1.2		E		N					AG				DO				5d	M
Village Creek	11010013	-006	4C	25.2	VGC01&03	M		N					AG				DO				5d	M
Wattensaw Bayou	8020301	-015	4D	48.2	WHI72	M		N					UN				DO				5d	M
M. Fk. Little Red	11010014	-028	4E	12.0		E		N	N				UN	UN			PA	DO			5d	M
M. Fk. Little Red	11010014	-027	4E	8.8	WHI43	M		N	N				UN	UN			PA	DO			5d	M
Hicks Creek	11010004	-015	4F	9.1	WHI65	M			N				MP	MP			PA	TP			5d	M
Black River	11010009	-005	4G	17.5	WHI25	M		N					AG				DO				5d	M
Strawberry R.	11010012	-006	4G	19.0	WHI24	M		N					AG				DO				5d	M
Spring River	11010010	-007	4H	4.0		E		N					UN				TEM				5d	M
Spring River	11010010	-006	4H	5.3	WHI22	M		N					UN				TEM				5d	M
Spring River	11010010	-003	4H	9.4	WHI21	M		N					UN				DO				5d	M
Warm Fork Spring	11010010	008t	4H	3.1	WHI06A	M		N					UN				DO				5d	M
Eleven Point River	11010011	-001	4H	33.1	WHI05B	M		N					AG				DO				5d	M
Caney Creek	8020203	-901	5A	9.0	FRA34	M					N	N	UN				TDS				5d	M
St. Francis River	8020203	-014	5A	22.8	FRA08	M		N					UN				Cu				5d	M
Ten Mile Bayou	8020203	006t	5A	17.3	FRA29	M		N					AG				DO				5d	M
Caney Creek	8020203	-901	5B	9.0	FRA34	M						N	AG				TDS				5d	M
Second Creek	8020205	-008	5B	16.4	FRA12	M		N					AG				DO				5d	M
L' Anguille River	8020205	-005	5B	44.1	LGR02	M		N					AG				DO				5d	M

Table IV-5: 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
Mountain Fork	11140108	-014	1D	11.0	RED01	M		N					UN				Tem				5e	M
Fourche LaFave R.	11110206	-007	3E	20.2	ARK37	M		N					UN				Tem				5e	M
Bayou DeView	8020302	-009	4B	20.3	WHI26	M		N				N	AG	MP	MP		TDS	CL			5e	M
Warm Fk. Spring R.	11010010	008t	4H	3.1	WHI06A	M						N	UN				TDS				5e	M
Crooked Creek	11010003	-049	4I	36.2	WHI66, 67	M					N	N	UN				TDS				5e	M
Crooked Creek	11010003	-048	4I	31.7	WHI48A,B,C	M					N	N	UN				TDS				5e	M
White River	11010001	-027	4K	23.8	WHI106	M		N					UN				DO				5e	M
West Fork	11010001	-024	4K	27.2	WHI51	M		N					RC	AG			TDS				5e	M
White River	11010001	-023	4K	6.2	WHI52	M		N				N	RC	AG			TDS	CL	SO4		5e	M
L' Anguille River	8020205	-005	5B	44.1	LGR02	M		N				N	AG	AG	AG		TDS	CL	SO4		5e	M
L' Anguille River	8020205	-004	5B	16.0	LGR01	M		N				N	AG	AG	AG		TDS	CL	SO4		5e	M
L' Anguille River	8020205	-003	5B	1.8		E		N				N	AG				TDS				5e	M
L' Anguille River	8020205	-002	5B	16.8		E		N				N	AG				TDS				5e	M
L' Anguille River	8020205	-001	5B	19.7	FRA10	M		N				N	AG				TDS				5e	M
Prairie Creek	8020205	901	5B	12.8	FRA35	M		N				N	AG	AG	AG		TDS	CL	SO4		5e	M

PART V GROUNDWATER 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; one, a summary of State ground-water protection programs and, two, a listing of the major sources of contamination in the State. The table format was designed by the EPA primarily for uniformity in reporting by the States.

Current guidance documents have varied little from the changes documented in the 1996 guidance. The EPA 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 EPA also strongly re-emphasized the goal of reporting ground-water quality for specific aquifers or hydrologic setting by the year 2006.

Because summarizing the assessment of the entire State's ground-water resources on a biennial basis is such a monumental and burdensome task, the EPA 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 2002 Arkansas Water Quality Inventory Report, and mainly includes tasks and data for FY02 and FY03 (October, 2001 through September, 2003). 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. The 1996 report should be referred to for specific information including tables and figures which describe in detail the geology, subsurface hydrology, and general ground-water quality for various portions of the State.

Groundwater 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% 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.

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 µg/L to 10 µg/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 the ADEQ. Arsenic concentrations in the alluvial aquifer range upwards to 50 µg/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% 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.

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. The Mississippi River Valley alluvial aquifer and the Sparta aquifer are the most important aquifers in eastern Arkansas, together supplying more than 95% 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.

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. See page 122,

Short-Term Water Quality Monitoring (Special Investigations) for additional information concerning water levels in both the Sparta and alluvial aquifers.

CHAPTER ONE GROUNDWATER 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 all of the remedial activities are the sole responsibility of the various divisions of the Arkansas Department of Environmental Quality (ADEQ), which has been authorized by the EPA 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 ten to fifteen years, which has seen an increase in joint ventures by both federal and state agencies in the monitoring and protection of Arkansas' ground-water resources. Current ground-water protection activities frequently involve joint efforts by two or more agencies, including state and federal agencies and universities.

Groundwater Availability and Use

Each year approximately 7000 million gallons per day (mgd) of ground water is pumped from the State's aquifers. The greatest volume (6593 mgd) is pumped from the Mississippi River Valley alluvial aquifer (alluvial aquifer), primarily for irrigation purposes, and the next greatest is from the Sparta-Memphis Sand aquifer system (approximately 287 mgd), used dominantly for municipal and industrial purposes (Terry Holland, USGS, personal communication).

The increased demand on ground water has resulted in water-level declines and water-quality degradation in many areas of the State. This situation resulted in the passage of Act 154 of 1991, which acts to identify critical ground-water areas in the State and regulate the usage, where necessary. Classification of critical ground-water areas are made when certain criteria are met including water levels below the top of a given formation (confined aquifer), saturated thickness of the formation less than 50% of the total formation thickness (unconfined aquifer), water-level declines of more than 1 foot per year over a 5 year period, and trends indicating degradation of water quality (ASWCC, 1998).

In 1995, the Sparta aquifer was designated as a critical ground-water area by the Arkansas Soil and Water Conservation Commission (ASWCC) in south Arkansas in a five-county area (Ouachita, Calhoun, Bradley, Columbia, and Union). In 1998, the ASWCC 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 (proposed critical area as of 2001) and St. Francis study areas in northeast Arkansas and the Boeuf-Tensas study area in southeast Arkansas.

Information used to evaluate water usage from the various aquifers are based on a water-level measurement network maintained under cooperative agreements between the ASWCC, the U.S. Geological Survey (USGS), the Arkansas Geological Commission (AGC), and the Natural Resources Conservation Service (NRCS). Through these cooperative agreements, over 1000 measurements are collected annually. Trends in water-level changes are monitored by the ASWCC for use in evaluating potential critical-use areas within the State.

Groundwater 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 the 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.

Groundwater 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. Existing and 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 Department of Health's (ADH) Wellhead Protection Program (WHPP) was authorized in the 1986 Amendments to the Safe Drinking Water Act and is designed to prevent contamination of underground sources of public water supply. The WHPP is a voluntary program that is developed by local communities with technical assistance and guidance from the ADH. A WHPP minimizes the potential for contamination by identifying the area that contributes water to municipal water supply wells and by implementing measures within the Wellhead Protection Area (WHPA) that will help avoid costly ground-water cleanup.

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 for increasing public awareness and coordination of 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 WHP Program. Emphasis is placed on local public participation and local controls to provide solutions to local problems.

The Arkansas WHPP completed conversion of the program's functions to electronic methods in 2003 and 2004, consisting mainly of the change to using a Geographic Information System (GIS) for data analysis and depiction of results. Compiling and maintaining a database of well information and other data in the GIS has also benefited similar organizations. Specifically, paper maps from geologic publications were scanned on the ADH's large-format scanner and "geo-referenced" for use as base maps for analysis of subsurface conditions in the GIS, greatly expediting evaluation of proposed new well sites and other WHP functions. This process elicited interest from the local USGS office and the AR Geologic Commission (AGC) after it was demonstrated to both agencies; cooperation for further conversion of paper archives followed and is ongoing. Use of geo-referenced work maps has improved and accelerated the AGC's digitization process.

Integration of the WHPP with the Source Water Assessment Program (SWAP) completed in 2003 has also been largely accomplished, introducing more efficiency and consistency in the WHPP. This convergence of the two programs was accomplished in ways that benefited both programs while maintaining the integrity of each program. Since two programs shared many of the same objectives, information compiled by the WHPP benefited the SWAP and vice versa. Presently, results and methods of the WHPP are being applied to the emerging Source Water Protection program. SWAPs, encouraged by EPA, are intended to extend the successes of the WHPP to surface-water supplies as well as ground-water sources.

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. Technical staff is provided by the ASWCC and includes full-time field inspectors and management and technical-support personnel. Several part-time employees assist in 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.

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.

Act 297 of 2003 (SB 241) authorizes the Commission to develop an apprenticeship program for drillers and pump installers and adds a continuing education requirement for drillers and pump installers. It ties the Commission'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.

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 GROUNDWATER 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 forms of reports and/or journal articles to publicly-accessible, computer storage formats such as the EPA'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 Groundwater Quality Monitoring

Ongoing ambient monitoring is performed primarily by two organizations: the 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 Arkansas Department of Health (ADH) also provides another source of data. The ADH is the primacy agency for the federal Safe Drinking Water Act (SDWA), which applies to drinking water purveyors. The ADH 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% of the maximum contaminant level (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 which 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.

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 ASWCC, 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.

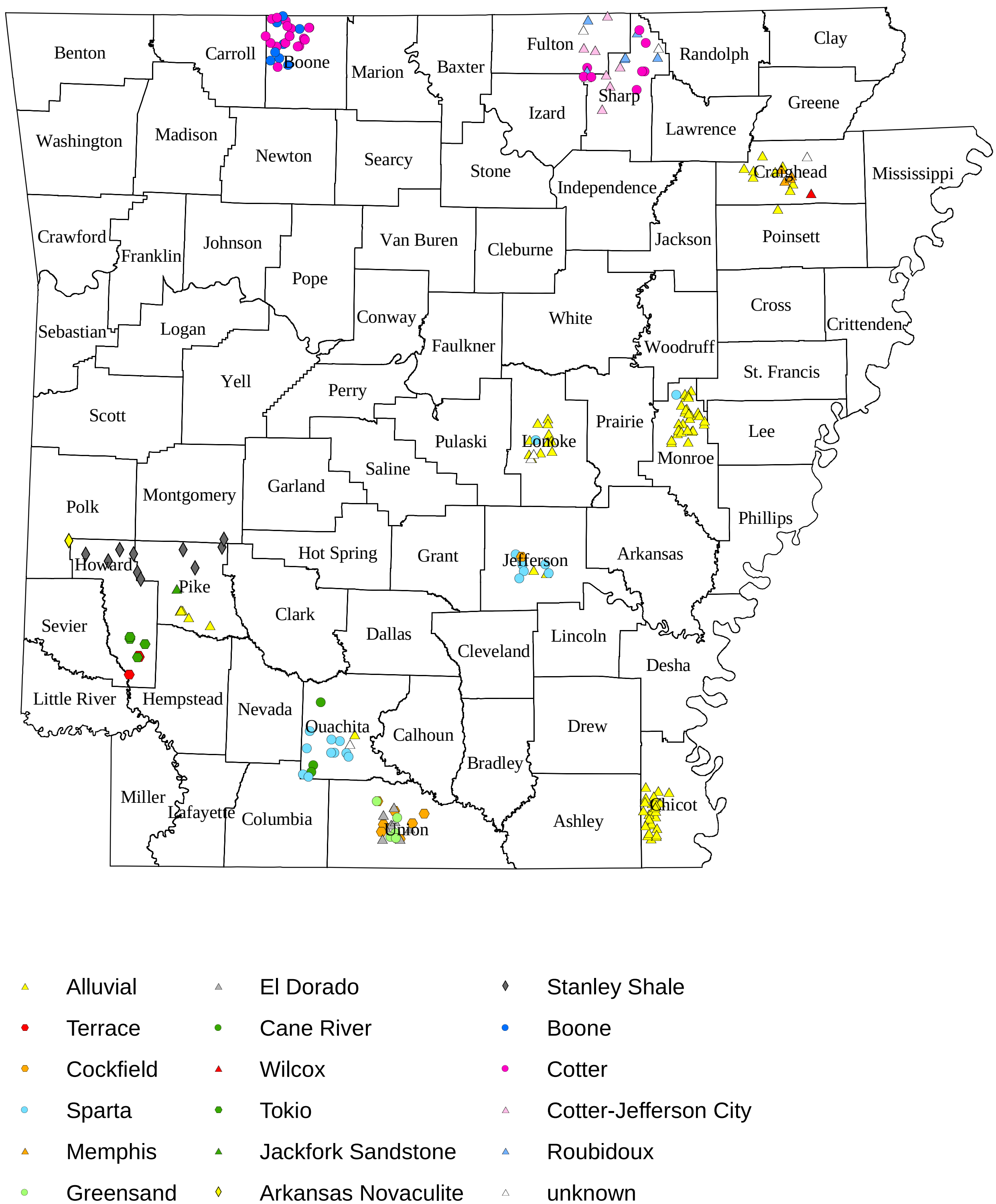
Arkansas Department of Environmental Quality

The Arkansas Ambient Ground-Water Monitoring Program (Program) was begun in 1986 by the ADEQ to monitor overall ground-water quality in the State of Arkansas. 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 are sampled on an approximate three-year basis.

All of the monitoring areas are potentially 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 and 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. For a listing of reports related to the monitoring areas, visit our web site at www.adeq.state.ar.us

Figure V-1: Arkansas' Groundwater Monitoring Wells



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. Because of elevated chloride levels and potential impacts from pesticides to the alluvial aquifer, ground-water monitoring in this area was initiated during FY89. A total of 30 ground-water wells were sampled during the most recent sampling event in FY03.

Chloride levels ranged from 9.7 to 535 mg/L, and 6 of the 30 wells exceeded the 250 mg/L secondary maximum contaminant level (SMCL). SMCLs are unenforceable federal guidelines regarding taste, odor, color and non-aesthetic (cosmetic) effects of drinking water. Iron was elevated in all samples, and both iron and manganese exceeded the SMCL of 0.3 mg/L and 0.05 mg/L, respectively. Total dissolved solids (TDS) concentrations exceeded the SMCL of 500 mg/L TDS in 20 of the 30 samples. Arsenic was detected in 15 of the 29 alluvial aquifer samples at concentrations ranging from 1.02 to 5.12 *u*g/L, however, these concentrations are well below the maximum contaminant level (MCL) for arsenic of 10 *u*g/L. Pesticide analyses were last performed on 12 of the irrigation-well samples in FY98. At that time, bentazon was detected in three samples and was the only pesticide detected in the samples. 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 health advisory limits (HALs) for these pesticides.

Based on the information gathered during this period and past investigations into the area (Fitzpatrick, 1985; Huff and Bonch, 1993; and Onellion and Criner, 1955), an extensive investigation was initiated in the spring of 2000 to evaluate the source and extent of saltwater intrusion in Chicot County. A general background and problem statement detailing past studies and preliminary findings is located in Kresse, et al. (2000). Presently, 249 wells have been sampled in Chicot County, including 217 wells in the alluvial aquifer, 27 wells in the Cockfield Formation, four wells in the Sparta aquifer and one well in the Wilcox Formation. Five monitoring wells were drilled and completed in the Cockfield aquifer, 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 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 District Office of Natural Resources Conservation Service (NRCS) 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 of the findings from the investigation was initiated during the FY02 and FY03 periods and is pending based on additional planned monitoring over the next year or so.

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 and gas production 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 third quarter of FY01.

Ground-water samples were obtained from ten 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 4 of 23 wells above the recommended SMCL of 0.3 mg/L, and manganese was detected in 6 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. Several phthalate compounds, in addition to methylene chloride and acetone, were detected in all of the Cockfield well-water samples. All detections were less than 3 *u*g /L and are directly attributable to laboratory contamination (acetone and methylene chloride) or household plumbing materials (phthalate compounds). One sample, UNI094, had elevated concentrations of chloromethane, bromoform, chloroform, bromodichloromethane, and dibromochloromethane, ranging from 17 to 102 *u*g /L. The well owner, on the advice of a friend, had placed a large dose of household bleach into the well two weeks 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 as of the FY03 sampling event, includes 24 wells ranging in depth from 70 to 1590 feet and two springs. 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 of all samples is a 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 two samples. TDS concentrations were below 500 mg/L in all wells and springs including four wells exceeding 1000 feet in depth, and averaged 296 mg/L. The four deep wells had a lower mean nitrate-nitrogen concentration (~ 0.23 mg/L) than the overall mean for all wells (1.02 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 2003 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 ground-water samples 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. Seven of the 12 alluvial-aquifer samples had calcium concentrations which comprised over 50% of the total cations (calcium-bicarbonate water type). Six of these seven samples had iron and manganese concentrations ranging from 3010 to 8790 *u*g /L and 185 to 2180 *u*g /L, respectively. Four of these six iron- and manganese-enriched samples had associated low-level arsenic detections and elevated barium detections, ranging from 1.16 to 3.35 *u*g /L and 196 to 393 *u*g /L, respectively. All five of the Memphis-aquifer samples were of a mixed-water type. One sample was drawn from the Wilcox Formation from a depth of 871 feet. This sample was strongly sodium-bicarbonate, with a sodium concentration comprising 96.2 % of the total cations and a bicarbonate concentration comprising 97.2% of the total anions. One alluvial-aquifer sample from a shallow irrigation well revealed a calcium-chloride water type, which is possibly the result of excessive drawdown in the alluvial aquifer. The water chemistry in this well has changed markedly since the 1998 sampling event. There was an approximate two-fold increase in TDS, a three-fold increase in sulfates, and a five-fold increase in chlorides in the 2003 sample versus the 1998 sample.

Overall water quality in the monitoring area is suitable for most all uses, with TDS concentrations ranging from 72 to 703 mg/L. The highest nitrate-nitrogen concentration (2.08 mg/L) was in a Memphis-aquifer water sample, and three of the four 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 FY01.

Ground-water samples were obtained from thirteen wells in the alluvial aquifer and one well 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 fourteen wells above the recommended SMCL of 0.3 mg/L, and ranged from 2.14 to 28.4 mg/L. Manganese also was detected in all wells above the recommended SMCL of 0.05 mg/L, and ranged from 0.25 mg/l to 1.2 mg/L. Measured TDS was above the recommended SMCL of 500 mg/L in three of the wells. Selected descriptive statistics are listed in Table 12B in Appendix B of this report. In addition, the pesticide bentazon was detected in three wells (LON020, LON014 and LON016) and ranged from 0.008 *u*g /L to 0.35 *u*g /L. These concentrations are far below HAL of 200 *u*g /L. These data are summarized in Table 12B in Appendix B of this report.

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 at a former wood treatment plant; a listed Superfund site. Ground-water samples are obtained from a combination of wells and springs.

Ground-water monitoring began during the first and second quarters of FY89 with the most recent sampling event being completed during the second quarter of FY03.

Ground-water samples were obtained from ten springs and seventeen wells. With one exception, all of the springs discharge from the Springfield Plateau aquifer. Similarly, all but one of the wells penetrate 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, excluding the one well completed in the Roubidoux/Gunter interval of the Ozark aquifer. Nitrate-nitrogen concentrations were highest in the Springfield Plateau aquifer spring samples, ranging from 2.25 to 10.20 mg/L, with a mean concentration of 4.78 mg/L. Nitrate-nitrogen concentrations from the Ozark aquifer well samples were markedly lower, ranging from 0.01 to 1.42 mg/L, while the one spring issuing from this aquifer had the highest nitrate-nitrogen concentration at 2.28 mg/L. Arsenic was detected in 3 Ozark aquifer samples at concentrations ranging from 1.44 to 6.96 *u*g/L, however, these concentrations are lower than the MCL for arsenic of 10 *u*g/L. Selected descriptive statistics are listed in Table 14B in Appendix B of this report. One of the ground-water samples, from a spring located downgradient of the Superfund site, was analyzed for SVOC constituents during the sampling event completed in the second quarter of FY99. Several SVOC constituents, including pentachlorophenol at a concentration of 707 *u*g /L, were detected in the sample. This well was cited in the 1998 305b Report as being impacted by a wood preservative site and was reported to the HWD. The spring water currently is being captured and treated at a plant constructed next to the spring. Current levels of SVOCs analyzed from a sample at the spring orifice demonstrate that SVOC concentrations are decreasing from original 1998 values.

Ouachita Monitoring Area

The Ouachita 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; one of the most heavily-used aquifers 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 an approximate 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 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 of this report. 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 of this report.

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 third quarter of FY01.

Three wells penetrating the Cockfield aquifer, four wells penetrating the alluvial aquifer, and thirteen wells penetrating the Sparta aquifer were sampled in FY01. 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. Iron was detected in 19 of the 20 wells above the recommended SMCL of 0.3 mg/L. Manganese was detected in 18 of 20 wells above the recommended SMCL of 0.05 mg/L. Selected descriptive statistics are listed in Table 18B in Appendix B of this report. VOC analysis was conducted on the four alluvial samples. Methylene chloride, a common laboratory contaminant, was detected in three of the four samples, in addition to being detected in the trip blank.

Athens Piedmont Plateau/Gulf Coastal Plain Monitoring Area

The Athens Piedmont Plateau/Gulf Coastal Plain Monitoring Area in southwest Arkansas includes 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, and serve to expand our knowledge of baseline ground-water quality of the State's aquifers, as well as to determine the potential impacts from the agricultural industry, which include extensive swine, broiler and cattle operations. The monitoring area includes a total of 25 wells and one spring in Howard and Pike counties and was first sampled in FY04. A summary of the sites and locations is located in Table 19B in Appendix B of this report.

Samples taken in the northern part of the study area along the southern margin of the Ouachita Mountains were derived 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 vast majority of municipalities within the two-county area derive their drinking water from surface sources, however, excellent domestic and livestock well control will enable future sampling from additional Cretaceous formations within the study area.

Water quality in the study area is generally good. One of the 26 samples, from a shallow well in the Stanley Shale, revealed a nitrate-nitrogen concentration of 14 mg/L, which exceeds the MCL for nitrate-nitrogen of 10 mg/L, while the concentrations in the remainder of the samples were well below 1 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 4 of the 5 samples from this interval. Three samples exceeded the SMCL for iron (0.3 mg/L), ranging from 1.41 to 40.4

mg/L. Eight samples exceeded the SMCL for manganese (0.05 mg/L) and ranged from 0.109 to 1.590 mg/L. Seven of 8 of these detections were derived from the Stanley Shale. TDS concentrations exceeded the suggested SMCL of 500 mg/L in 2 of the 26 samples. Arsenic was detected in 4 samples at concentrations ranging from 1.03 to 3.91 *u*g /L, however, these concentrations are well below the MCL for arsenic of 10 *u*g/L. Three of the arsenic detections were from the alluvial aquifer. Selected descriptive statistics are listed in Table 20B in Appendix B of this report.

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, the USGS, and the 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 FY02 and FY03, the USGS 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.

The Mississippi River Valley alluvial aquifer, located in eastern Arkansas, supplies an average of 6.6 billion gallons of water per day (2000 data). Withdrawals from the aquifer have caused considerable drawdown in the water-table surface. Two digital ground-water flow models of the alluvial aquifer, first developed and calibrated in the early 1990s, are being updated to provide a valuable tool for testing water-use/water-management pumping strategies. The existing models are using the MODFLOW-2000 software platform, recalibrated for the period of 1918-1998, and the effects of projected ground-water withdrawals are being simulated for a period through 2049. To develop estimates of withdrawal rates that could be sustained, conjunctive-use optimization modeling was applied to the flow models. Reports of these models are expected to be released in 2004.

The Sparta aquifer is a major source of water supply in much of central and southern Arkansas and northern Louisiana. Heavy pumpage from the Sparta aquifer has resulted in substantial drawdown of its potentiometric surface in some areas including the cities of Pine Bluff, Magnolia, and El Dorado. To evaluate the regional effects of aquifer development on water-level declines, a digital ground-water flow model is being recalibrated and refined so that analysts are better able to reliably address the plausibility of various local water-use scenarios. A number of predictive scenarios will be run with simulated response to withdrawals for the period 1998-2027 in both Arkansas and Louisiana. Conjunctive-use optimization modeling was applied to estimate the amount of ground water that could be withdrawn without violating hydraulic head or stream constraints. Reports of these models are expected to be released in 2004.

Ground-water level monitoring in Arkansas continued to be dynamic in 2002-2003. Over 300 water levels were measured from wells in the alluvial aquifer in 2002, the Sparta aquifer in 2003, and 112 water levels in the Cockfield and Wilcox aquifers in 2003. Long-term hydrographs and potentiometric maps are being published in reports. Continuing ground-water programs include: a cooperative program to monitor the ground-water levels of Arkansas' eight major aquifers on a rotating basis, the master wells ground-water quality program, maintenance of six continuous recording ground-water level stations, geophysical logging of wells, and conducting one aquifer test on a yearly basis. Additional water-quality data were collected in the two major aquifers of the State, the Sparta and alluvial aquifers, for specific conductance and chloride.

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 alternative water sources for industry. The impact of these conservation efforts in the recovery of water levels within the Sparta aquifer will be monitored in this study that began in 2003. This 5-year study will provide continuous, real-time, World Wide 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 being funded from a USEPA grant through the Union County Water Conservation Board working closely with the consulting firm Burns and McDonnell.

A 3-year project began in late 2001 with the ADH to determine the location and extent of the recharge area that contributes water to four public drinking-water supply springs in northern Arkansas. The study is investigating the boundaries of the recharge area and ground-water travel times by measuring spring flow and temperature, assessing the hydrogeologic characteristics of the spring basins, performing dye trace studies, and collecting water-quality samples. Fluorescent dyes in the dye trace studies have been analyzed using a scanning spectrofluorometer. Results to date indicate two of the springs respond to local recharge events, and two of the spring flows originate from regional aquifers outside the drainage basin. The report is expected to be released in 2004.

In FY01, at the request of the ADEQ, EPA Region 6 contracted the USGS to perform a preliminary hydrogeologic assessment of the shallow ground water system at the site of a former aluminum recycling plant in southwest Arkansas. Eighteen monitor wells were installed and sampled to determine the location of a salt plume. In FY02, the ADEQ funded a ground-water level and specific conductance monitoring network of the shallow wells. In FY03, a two-dimensional, direct-current resistivity surface geophysical survey indicated possible areas of salt contamination occurring in near-surface or deep subsurface ground water along four resistivity lines within the site. The report is expected to be released in 2004.

Decades of pumping from the alluvial aquifer for irrigation and from the Sparta aquifer for industry and public-water supply have affected ground-water levels throughout the upper Mississippi Embayment. Three USGS ground-water flow models (two of portions of the alluvial aquifer and one of the Sparta aquifer) recently have been developed in Arkansas to aid in determination of sustainable ground-water withdrawals. The USGS Districts of Arkansas, Louisiana, Mississippi, and Tennessee have proposed to develop and calibrate a multi-layered ground-water flow model that will be used to simulate ground-water flow within the alluvial, Sparta/Memphis, and Fort Pillow/Wilcox aquifers in eastern Arkansas, western Mississippi, western Tennessee, and northern Louisiana. The multi-layered ground-water flow model will allow simulation of the impact of pumping within one aquifer upon other aquifers in the system. A consortium of funding partners is being sought for this effort.

Annual precipitation ranges from 46 to 54 inches per year in Arkansas, however, water in some areas of eastern Arkansas is being withdrawn from the alluvial aquifer at rates that exceed recharge, and therefore cannot be sustained for the long term. Recharge to ground-water systems is frequently the least well-quantified variable in digital models describing ground-water flow, yet it can be one of the most important. A study is needed to develop improved estimates of recharge on a regional scale by direct or indirect application of several appropriate techniques to refine model parameters to assist in water-management decisions. Techniques or methods that are being considered to provide these recharge estimates are: Reservoir Water-Budget Analysis and Seepage Loss, Temperature Profiles Used to Estimate Vertical Ground-Water Velocity, Bouwer's Analytical Approach, Seismic Profiling to Determine Clay Thickness, and RORA (a computer program that estimates mean ground-water recharge rates using the recession-curve-displacement method).

Arkansas Department of Environmental Quality

A ground-water investigation was conducted in the Strawberry River watershed in northeast Arkansas in the summer of 2004. The purpose of the ground-water assessment was three-fold: to evaluate the potential impact of nonpoint sources on ground-water quality, to document general ground-water chemistry and water quality throughout the watershed, and to review and compare trends in ground-water quality over time through the review of other sources of data from the watershed. Sixty-two ground-water samples were collected from 53 wells and 9 springs, including 47 wells completed in the Ordovician-age rocks comprising the Ozark aquifer and four irrigation wells completed within a small portion of Quaternary-age alluvial sediments, which overlie the bedrock in the southeastern portion of the watershed.

Ground water is very important to residents in the four-county area encompassing the watershed, which includes Fulton, Izard, Sharp and Lawrence counties, and accounts for 99% of the total drinking-water use in these counties, including both domestic wells and municipal-supply systems. The ground water is generally a Ca,Mg-HCO_3 type water, with Ca accounting for over 50% of the total equivalent cation concentration in 46 of the 58 samples from the Ozark aquifer. The main problem for domestic and municipal-supply users is the high hardness concentrations in the ground water associated with the elevated Ca and Mg concentrations.

Two of the samples from wells completed in the Ozark aquifer contain NO_3-N concentrations which exceed the maximum contaminant level of 10 mg/L. A preliminary assessment of the two wells indicates septic-tank effluent as the source for the elevated nitrates. Eighteen of the 62 well-water samples contain NO_3-N concentrations exceeding 1.0 mg/L, which has been proposed as a background concentration for NO_3-N in the Ozarks of Arkansas (Adamski, 1997). Identification of the source of elevated nitrates is complicated by the numerous potential sources of nutrients and bacteria in the watershed, which include confined animal operations (animal-waste lagoons, stacked waste, etc.), land application of dry and wet animal waste, fertilizers, bat guano, and septic systems. Nine samples were taken from sites that dominantly housed confined animals, including poultry and dairy operations. Mean and median concentrations of NO_3-N for these nine samples exhibited no differences as compared to mean and median NO_3-N for the general population of samples. Effects of land use on water quality was evaluated by calculating the percent forest cover and the percent pasture land use within a one-mile radius of each well. Concentrations of NO_3-N initially revealed very poor correlations when compared to either percent forest and/or pasture land use. However, removal of four samples with NO_3-N concentrations greater than 6.0 mg/L resulted in a negative correlation between NO_3-N concentrations versus forest cover, and a positive correlation of NO_3-N concentrations versus percent pasture land use. The R^2 values for both regressions were very poor, and the correlations can only be viewed as general trends rather than an absolute cause and effect relationship (Kresse and Fazio, 2004).

The ADEQ recently has become involved in a joint effort with the Nature Conservancy and the University of Arkansas at Fayetteville to monitor the water quality and biological diversity within selected caves in northwest Arkansas. Approximately 80 cave systems, extending from northwest to northeast Arkansas, were sampled in April 2001 for a limited set of constituents by the University of Arkansas. The ADEQ analyzed 30 of these for a full suite of parameters including nutrients, major cations and anions, total dissolved solids and trace metals. In April, 2002, the springs again were sampled and the ADEQ analyzed 25 of the samples for a complete set of parameters. One aspect of the investigation was to determine water type relative to area geology, with the intent of identifying the water chemistry resulting from water/rock interactions as opposed to anthropogenic impacts from various land-use activities, and water quality as related to health and diversity of cave biota. The active interest on the part of all parties to continue monitoring selected caves for long-term trend data has resulted in the commitment on the part of the ADEQ to add a selected list of caves to the ambient monitoring program. The recent formation of the KaRST group in Arkansas, which is charged with protection of cave systems in northern Arkansas, will ultimately affect the coordination strategy and water-quality sampling activities associated with cave sampling and monitoring of karst systems in Arkansas.

Another project conducted during FY02 and FY03 included the review of existing water-quality data sets from the ADEQ files 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 EPA revision of the MCL for As from 50 *u*g /L to 10 *u*g /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 *u*g /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 *u*g /L have been documented in ground-water samples from these regions of the State.

Preliminary evidence from the statistical treatment of existing data sets suggest that elevated levels of As in the alluvial aquifer of eastern Arkansas are the result of the dissolution of As-bearing Fe and/or Fe- and Mn-oxide coatings on the sand grains serving as the aquifer material. Reductive dissolution of the Fe oxides appears to be the mechanism of release for the As 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).

University of Arkansas at Fayetteville

The U of A at Fayetteville has been actively involved in ground-water quality investigations for the last 2-3 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 U of A Departments of Animal Science and Geology, the ADEQ, the Agricultural Research Service of the USDA, and the 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.

Continued development of Eu-tagged *E. coli* bacteria and La-tagged clay tracers has been ongoing with support from the National Science Foundation. Rapid production of large quantities of the tagged tracers resulted in the production of approximately 500 g of tagged clay and 700 g of tagged bacteria, which were injected in a losing stream segment at the SEW in the spring of 2004 and collected at springs identified through intensive tracing as discharge points for the ground water incorporating the losing stream segment. The tagged bacteria and clay were injected along with rhodamine and fluorescene dye to evaluate travel times associated with transport of the injected material. Preliminary results show that using larger quantities of tracer than used in the initial tests in 2000 (see 2002 305b report) is allowing the monitoring of tracer behavior in the aquifer over extended time periods and over multiple transient events (recharge from storm pulses) (written communication, Ralph Davis, University of Arkansas at Fayetteville).

Extensive data has been collected from the Savoy experimental watershed including detailed soil mapping and soil properties such as infiltration rates, clay content, etc., a large water-quality data set collected from numerous springs, seeps, and shallow and deep wells, application of the Agricultural Nonpoint Source Pollution model for prediction of nutrient transport and nutrient sinks, and numerous other studies by multi-departmental efforts. Because of the detailed geologic and hydrologic information gathered at the site, development of a ground-water model was recently undertaken to simulate ground-water flow at the site. Identification of fractures, sinkholes, sinking streams, caves, springs, seeps and other karst features within the SEW was completed using field reconnaissance and inspection of aerial photography, satellite imagery, and topographic maps. Digital data sets for elevation, landuse, location of karst features, and orthophotoquads were compiled in ArcView GIS. These digital data provided the basis for defining physical controls on groundwater flow which in turn were used for model discretization using Visual Modflow. The model was calibrated to steady-state conditions using head from wells in basin 1 at SEW, and to discharge from Copperhead and Langle springs, which are the primary drains for basin 1. Transient calibration was completed for discharge at the two springs resulting from storm-induced recharge events. The next phase of model development at the SEW site will be to use the model to reproduce the tracer breakthrough curves from the most current tracer injection in May 2004 (Unger et al., 2003).

Another recent investigation initiated at the SEW site involves the study of nutrient flux from pastures at the SEW. A macro-scale plot has heavily instrumented a site at the SEW to allow for calculation of mass balance from surface applied nutrients. Monitoring of surface runoff, infiltration, and shallow subsurface flow will provide data sufficient to calculate mass flux through the system. The instrumentation was completed in the spring of 2004 and initial monitoring has occurred over several significant recharge events this past spring. The plan is to apply nutrients to the site (poultry litter application) and then monitor the flux of various components including nitrogen and phosphorus for both surface and subsurface routes (Ralph Davis, University of Arkansas at Fayetteville, written communication).

Preliminary results have been completed for assessing the feasibility of using coal-mine water as a municipal-supply source for a small city in western Arkansas. Abandoned coal mines underlying Greenwood, Arkansas have been flooded and include both surface pits and underground workings. These voids represent a huge potential reservoir of water that could be used to augment the water needs of the city, depending on the quality of the water. The study was based on field data collection, water quality sampling, water-level measurements, precipitation measurements, pumping tests, field reconnaissance, historical data compilation, lab testing, and modeling. Field and lab analyses have assessed major constituents, minor constituents, trace metals, microbial pathogens, nutrients, organics, color, and other relevant EPA drinking water requirements. Water levels at key components of the hydrogeologic system have been monitored continuously using transducers, floats, and analog strip-chart recorders, and a tipping bucket rain gauge has provided a continuous record of precipitation recharge. By comparing response to hydrologic events, both magnitudes and lag times, the degree of interaction between the surface- and ground-water parts of the system have been documented. Field reconnaissance and historical records have been compiled, and a conceptual model serves as the basis of flow models which are presently being tested. A conservative estimate is that in Greenwood #2 alone, more than 20 million cubic feet of water is stored. If no recharge occurs, the City could pump 5 million gallons per day for 30 consecutive days without depleting this single mine of all its water. The water in the mines was sampled at available wells, and from where it exits at Alkali Pit. It varies from very fresh, better than the current source of water from Vache Grasse Creek, to highly mineralized. Mine water is highest in dissolved iron, sodium, bicarbonate, and sulfate. The high mineralization is caused by ground water interacting with the wall rock of the mine, and is to be expected. Pumping tests indicate that the water is stratified, with the denser water near the bottom of the void spaces, and less-mineralized fresh water at the top (Varnell, 2004).

Two concurrent studies were conducted to evaluate small-scale spatial variability of the alluvial aquifer water chemistry in eastern Arkansas. Although various studies have noted spatial variability in the construction of isoconcentration maps of specific conductance, chloride and other ions, there have been no studies of chemical variability on a small scale, which is essential for determining the density of wells that adequately represent aquifer quality across a region and to establish meaningful contour intervals for parameter values. The objective of the investigation was to ascertain the spatial and temporal variability of ground-water chemistry from the alluvial aquifer in eastern Arkansas on a small scale. Fifteen wells were sampled at three different sites during the summer of 2002. Some historical analyses, including ongoing nitrate analyses from two of the sites, were also used for sake of comparison to the 2002 values. The samples collected in 2002 and the historical nitrate collection dates were classed as either recharge (e.g., June samples) or non-recharge (e.g., August samples) conditions in order to determine the impact of recharge conditions (season) on the water chemistry. Shallow wells exhibited significant spatial Mg, Na, HCO_3, Cl, and SO_4. These ions revealed maximum concentrations 1.4 to 6.8 times the minimum concentration for shallow wells. Some temporal variation occurs for shallow wells at one site; the maximum to minimum concentration ratios range from 1.3 to 4.7. Deep wells have ion concentrations similar to shallow wells, but generally, the ions have smaller concentration ranges. Heterogeneous mineral and organic carbon abundances, and variable residence times, which affect amount of mineral dissolution and cation exchange, have a major impact on the water chemistry. These factors are the result of discontinuous sedimentary units with variable thickness and extent that affect ground-water movement. Other factors affecting the water chemistry are recharge conditions and fluctuating water-table depths that change ground-water flow directions, and that allow de-watering of saturated fine-grained sedimentary units when the water table is declining. There is significant spatial and temporal variability of nitrate. Spatial variability is as great as 0.04 to 14.45 mg/L NO_3-N, and temporal (45 days) variability in a well is as great as 0.11 to 14.45 mg/L NO_3-N. Deeper wells generally have low nitrate concentrations. The variation of nitrate concentrations can be explained by transport of nitrate from fertilizer to the ground-water system and subsequent denitrification within the alluvial aquifer (Steele et al., 2003a, 2003b).

Two major nonpoint source investigations were performed by the ADEQ beginning in 1995 and extending over an approximate 7-year period. One investigated the operation, design and management, and impact to water quality from confined swine operations with liquid waste systems, while the other investigated similar impacts from dairy operations. Unfortunately, both studies dealt with facilities which had been in operation over a number of years, and usually had a nearby household using septic system treatment of its waste. Long-term nutrient impacts from more than one source tend to complicate the identification and mass loading from a single source. One project currently underway at the SEW solves many of the problems inherent in contamination investigations by evaluating the effectiveness of waste-storage practices at the new Savoy Swine Research Farm. Because of the extensive monitoring at a relatively pristine site and the lack of other direct nutrient sources, monitoring of ground water surrounding the facility will be able to better quantify direct impacts as a result of the swine waste ponds. Nine wells have currently been installed in the epikarst to monitor the shallow ground water at the site. The nine wells and two springs were monitored during high water-table conditions on April 12,

2004. Preliminary results indicate that the swine facility is not adversely affecting water quality, as concentrations of nitrate, chloride and bacteria are similar to past results.

Pesticide Investigations

The investigation of pesticide impacts to shallow ground water in the State is listed separately from short-term monitoring activities because of the ongoing efforts and long-term implications of the monitoring process. Additionally, 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 NO_3-N 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 manifested in gathering 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 the ADEQ. Monitoring by the AWRC was funded under the EPA 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 will begin active monitoring in the summer of 2004. The 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 under the 319 Nonpoint Assessment Program. The USGS has also monitored for the occurrence of pesticides as part of the NAWQA Program.

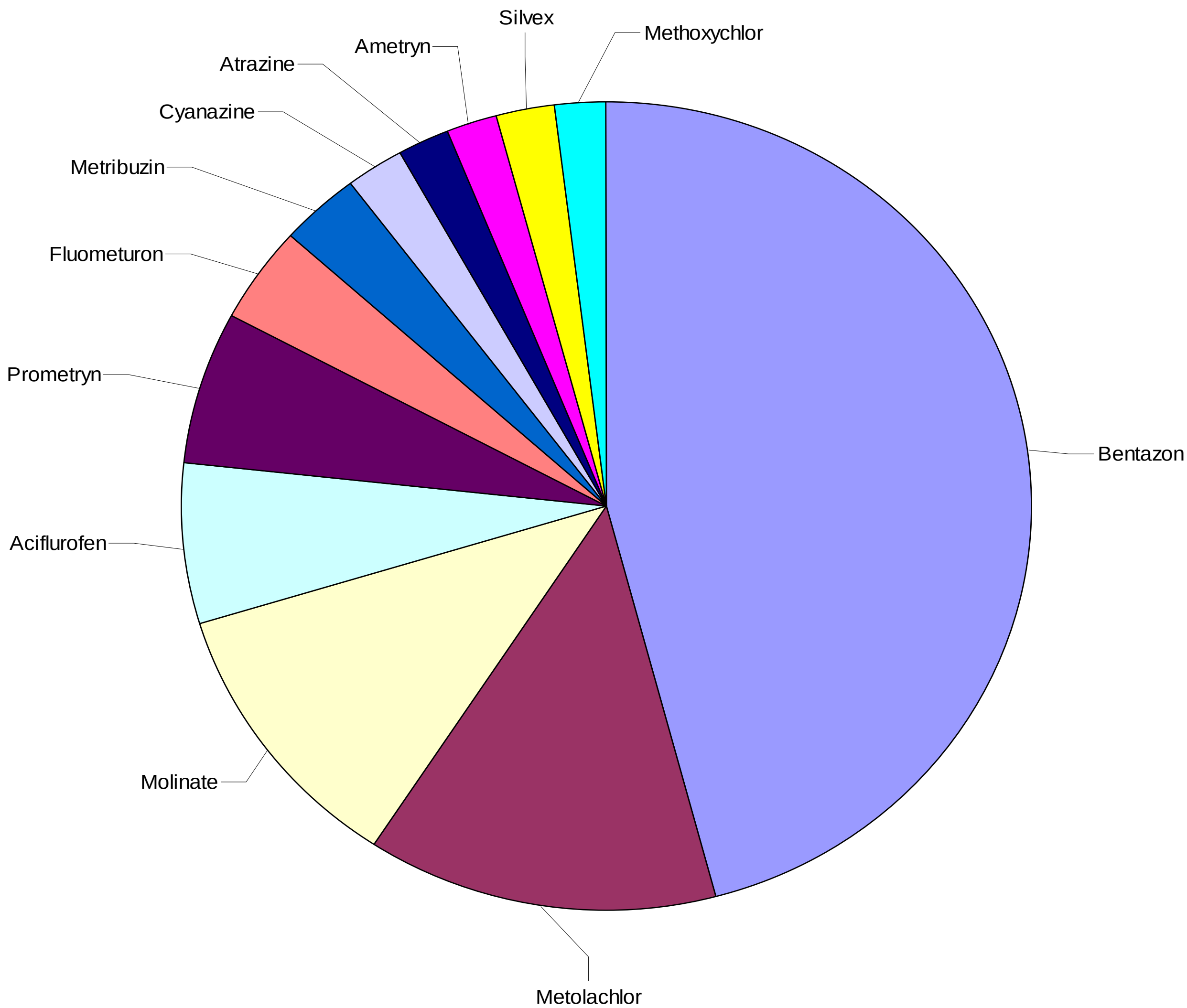
Several documents serve as an excellent introduction into the types and concentrations of pesticides detected to date in eastern Arkansas within the alluvial aquifer. Steele, et al. (2002) lists results from the most recent (Phase VIII) sampling period by the AWRC, and also provides an excellent background 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) presents the results of the sampling of 120 wells in the Bayou Bartholomew watershed with a discussion on sources of pesticide contamination. Because the 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 the AWRC and the ADEQ in the last decade. The rate of detection for the

AWRC averaged approximately 5% of total wells; whereas the detection rate for ADEQ is closer to 30% 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% 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 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. 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 *u*g /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.



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The interaction of ground and surface water, manifested in the form of losing and gaining streams, impacts regulatory programs, ground-water pollution-prevention programs, and ground-water research programs. This problem has plagued the ADEQ in both policy and regulatory development and in regulation and cleanup at contaminated sites. For example, 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 Coastal Plain area of the State, 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 the Coastal Plain 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.

Cooper et al. (2001) investigated ground-water quality within the Grand Prairie region of Arkansas in an area bounded by the Arkansas River on the west and the White River on the east. The area is within a large cone of depression developed by agricultural pumping rates that exceed recharge to the aquifer. Previous studies had concluded that the two rivers have affected ground-water flow and are effectively providing constant recharge to the alluvial aquifer (Mahon and Poytner, 1993; Kresse and Huetter, 1999). Cooper et al. (2001) noted that the area between the Arkansas River and Bayou Meto is characterized by low pH water with relatively high concentrations of iron, while the area between Bayou Meto and the White River is high pH water with low iron concentrations. Ground water in this portion of the aquifer is also saturated with respect to calcium whereas the ground water in the area between the Arkansas River and Bayou Meto is undersaturated with respect to calcium. The researchers attributed the distinct hydrochemical characteristics to infiltration of water from the Arkansas and White Rivers in these two respective areas of the aquifer.

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 the ADEQ, the University of Arkansas at Fayetteville, the USGS, the ASWCC and the National Park Service (NPS). 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.

Buffalo River Watershed Liquid Waste Management System

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.

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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 areal 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 areal extent of the contaminant plume may be very limited with no known receptors at risk. Conversely, contamination from agricultural activities may be areally 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 the 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 *Groundwater Protection Programs* on page 109.

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 the 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-1 lists the major potential sources of contamination.

The EPA 1996 305(b) guidelines encourage each state to list the ten highest priority sources of ground-water contamination. The factors considered when selecting these priority sources of ground-water contamination in Table V-1 are listed in order of importance next to each source. However, the contaminant sources are not ranked. The following factors are listed below:

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

Table V-2 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 the 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. Preliminary drafts of both the policy document and technical guidance documents were completed in the later part of 2003, and subsequent meetings have been set to discuss potential modifications.

Table V-1: Major Sources of Groundwater Contamination

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			

Table V-2: Summary of State Groundwater 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	ASWCC/U of A
Aquifer Mapping	X	Continuing Efforts	Multi-Agency
Aquifer Characterization	X	Continuing Efforts	Multi-Agency
Comprehensive Data Management	X	Under Development	ASWCC
EPA Endorsed CSGWPP	X	Pending	ASWCC
Ground Water Discharge Permit	NA	NA	ADEQ
Ground Water – BMPs	X	Continuing Efforts	Multi-Agency
Ground Water Legislation	X	Usage only/Established	ASWCC
Ground Water Classification	X	Continuing Efforts	ADEQ/ASWCC
Ground Water Quality Standards	X	Under Development	ADEQ
Interagency Coordination – GW	X	Continuing Efforts	ASWCC
Nonpoint Source Controls	X	Continuing Efforts	ASWCC/ADEQ
Pesticide State Mgmt Plan	X	Fully Established	SPB
Pollution Prevention Program	X	Continuing Efforts	ADEQ, ASWCC, 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/ASWCC
EPA-Approved WHPP	X	Fully Established	ADH
Well Installation Regulations	X	Fully Established	AWWCC/ASWCC

ADEQ: Arkansas Department of Environmental Quality; AS&WCC: Arkansas Soil and Water Conservation 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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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.
4. An assessment of use support by river reach.
5. A map of NPDES permitted discharges within the segment.
6. A listing of permitted discharges within the segment.
7. A summary of water quality data for each monthly monitored station within the segment from October 1, 1998, through December 31, 2001.

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

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

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

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

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 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 parameters;
    b. Other pollution control requirements are expected to result in attainment of water quality standards; and/or
    c. Impairment not caused by 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 sub-categories:
    a. Truly impaired, develop a TMDL for the listed parameter;
    b. Waters not attaining standards, but will be de-listed with adoption of current 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 is scheduled;
    e. Waters which were listed because of a small magnitude of exceedance from the water quality standards. The next revision of the assessment methodology will address magnitude of exceedance. The need for a future TMDL will be based on this protocol.

Appendix A Table of Contents

This appendix contains the following sections:

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Red River Basin

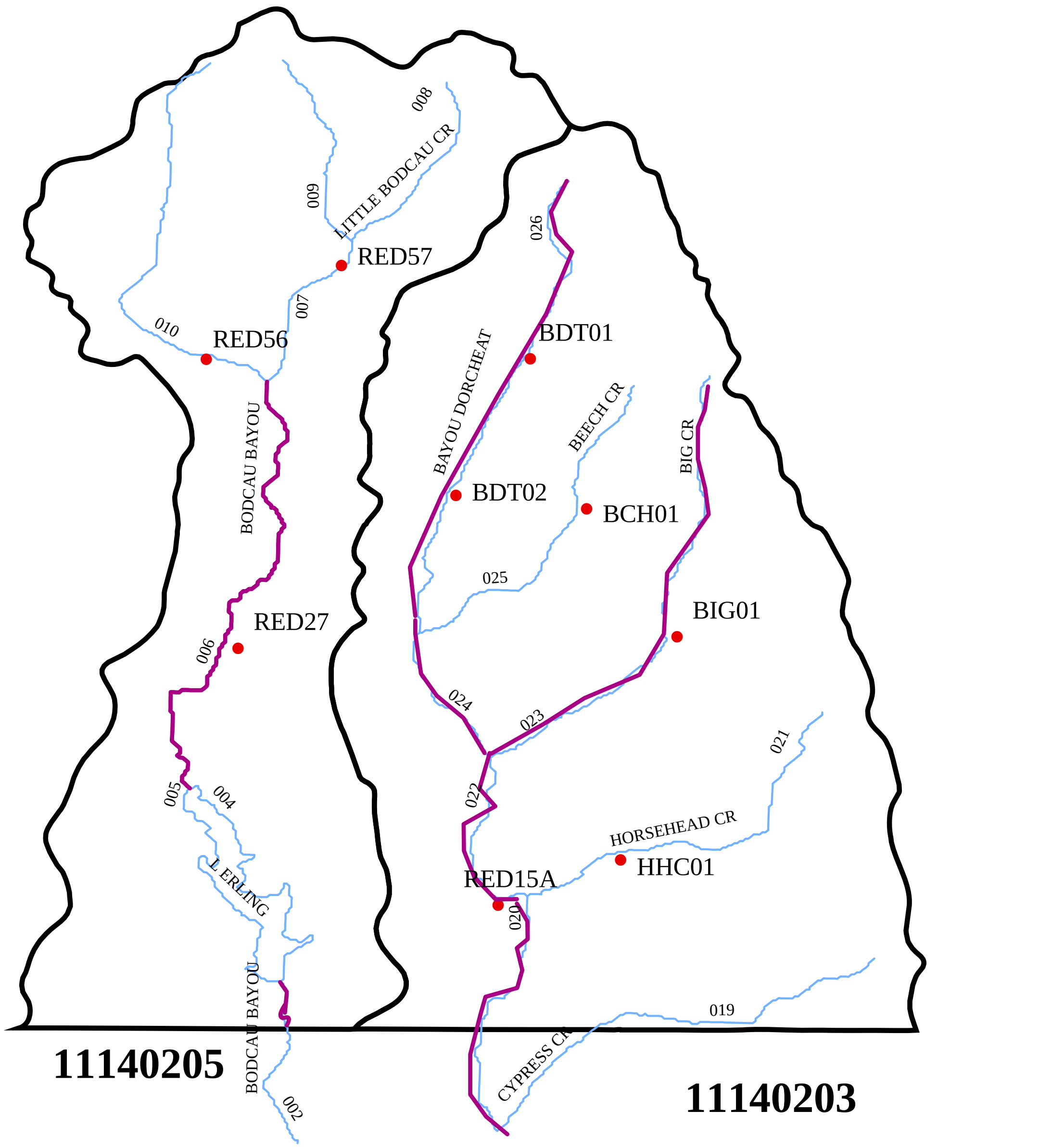
SEGMENT 1A DORCHEAT BAYOU AND BODCAU BAYOU

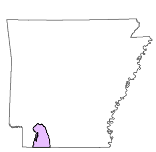
This segment is located in the southwest corner of the State and includes most of Columbia County as well as parts of Nevada, Hempstead and Lafayette counties. The drainage is generally southward into Louisiana and the major streams are Dorcheat Bayou and Bodcau Bayou. Lake Erling is a major impoundment 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 91.6 miles of stream within this segment. An additional 70.8 miles were evaluated bring the total number of miles assessed with in this segment to 151.6 stream miles. Mercury contamination was the cause for 50.6 miles of Dorcheat Bayou being listed as not supporting fish consumption. All other stream segments in this basin support all designated uses. Lake Columbia is impaired for fish consumption due to high mercury content in some predator fishes.

Figure A-1: Planning Segment 1A – Monitoring Stations



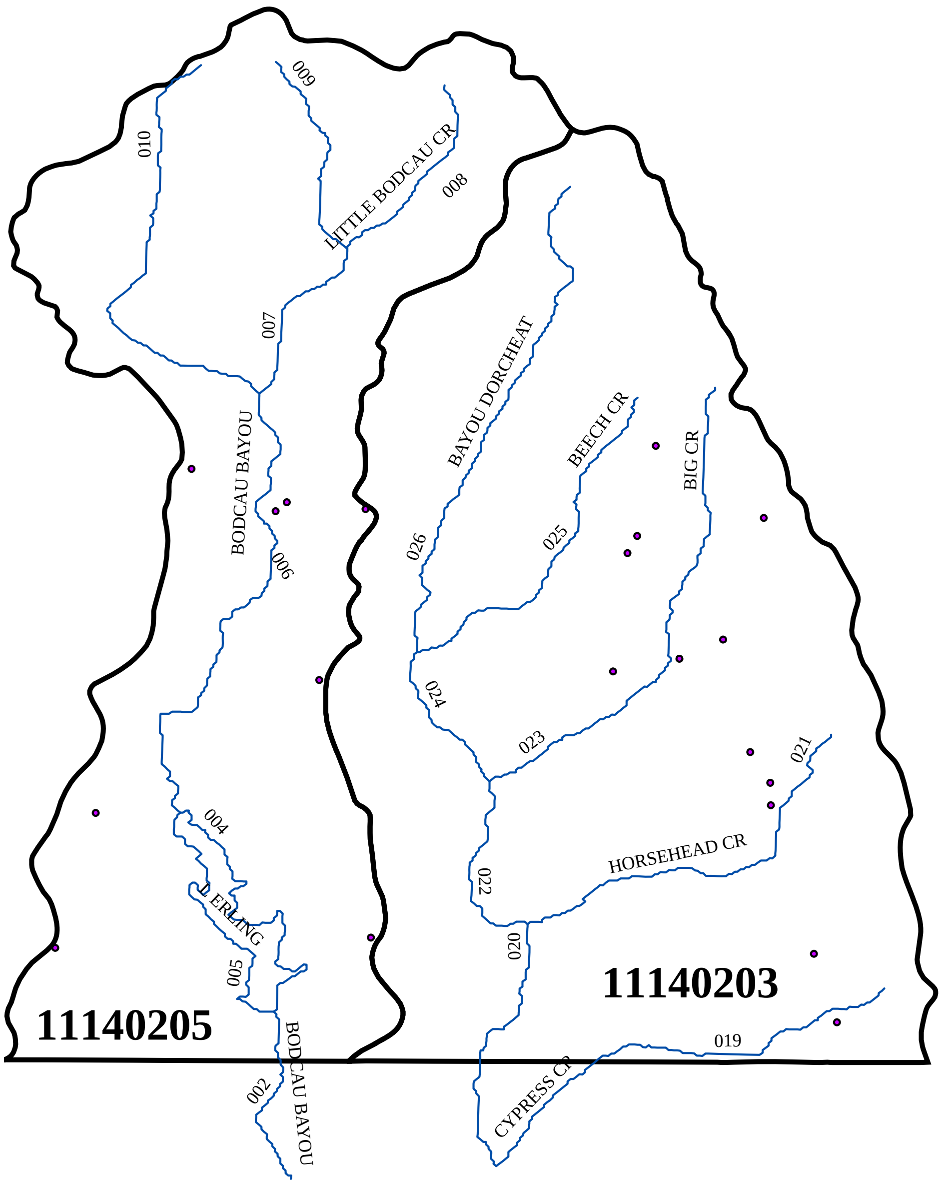


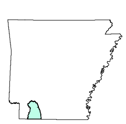
(Segment 1A)

Table A-1: Planning Segment 1A—Designated Use Attainment Status

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-1A																										
Dorcheat Bayou	11140203	-026	23.3	BDT01,02	M	N	N	S	S	S	S	UN	UN			HG	pH			4a	5c			FISH CONSUMPTION	111.8	50.6
Dorcheat Bayou	11140203	-024	7		E	N	N	S	S	S	S	UN	UN			HG	pH			4a	5c			AQUATIC LIFE	83.4	79
Dorcheat Bayou	11140203	-022	8.4	RED15A	M	N	N	S	S	S	N	UN	UN	UN		HG	SO4	pH		4a	5b	5c		PRIMARY CONTACT	162.4	0
Dorcheat Bayou	11140203	-020	11.9		E	N	N	S	S	S	N	UN	UN	UN		HG	SO4	pH		4a	5b	5c		SECONDARY CONTACT	162.4	0
Cypress Creek	11140203	-019	18.5		U															3				DRINKING SUPPLY	162.4	0
Horsehead Creek	11140203	-021	16.8	HHC01	U															3				AGRI & INDUSTRY	120.3	42.1
Big Creek	11140203	-023	21.8	BIG01	M	S	S	S	S	S	N	MP	MP	MP		CL	SO4	TDS		5b	5b	5b				
Beech Creek	11140203	-025	15.7	BCH01	M	S	S	S	S	S	S									1						
Bodcau Creek	11140205	-010	19.5		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		E	S	S	S	S	S	S									1						
Bodcau Creek	11140205	-006	22.4	RED27	M	S	N	S	S	S	S	UN	UN	UN		SI	pH	Zn		5a	5c	5d				
Bodcau Creek	11140205	-002	6		E	S	N	S	S	S	S	UN	UN	UN		SI	pH	Zn		5a	5c	5d				
TOTAL MILES	197.7																									
MILES UNASSESSED	35.3																									
MILES EVALUATED	70.8																									
MILES MONITORED	91.6																									

Figure A-2: Planning Segment 1A – NPDES Permitted Facilities





(Segment 1A)

Table A-2: Segment 1A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000434	American Fuel Cell & Coated FA	TRIB, BIG CR, DORCHEAT BAYOU, RED R	11140203	1A
AR0000493	Entergy AR, Inc. – Harvey Couch	LAKE JUNE TRIB, BODCAW CR	11140205	1A
AR0020044	Taylor, City of	LITTLE CROOKED CR	11140205	1A
AR0020621	Bradley, City of	DITCH, WHEELER CR	11140205	1A
AR0021555	McNeil, City of	O'REAR CR, BIG CR	11140203	1A
AR0021920	Stamps, City of	BODCAU CR, RED R	11140205	1A
AR0035696	Lewisville, City of	STEEL CR, BODCAU BAYOU	11140205	1A
AR0038857	Albemarle Corp – South Plant	HORSEHEAD CR, DORCHEAT BAYOU	11140203	1A
AR0039594	Emerson, City of	TRIB, LITTLE CYPRESS CR, DORCHEAT BAYOU	11140203	1A
AR0043508	Waldo, City of	TRIB, BIG CR	11140203	1A
AR0043613	Magnolia, City of	DITCH, BIG CR, DORCHEAT BAYOU, RED R	11140203	1A
AR0043923	Willamette Industries – Emerson	SOUTH CYPRESS CR, DORCHEAT BAYOU, LAKE BISTINEA	11140203	1A
AR0045535	Camp Canfield	MILL CR TRIB	11140205	1A
AR0046418	Longview Gas Co.	TRIB, CROOKED CR, WALKER CR, BAYOU DORCHEAT	11140205	1A
AR0046973	Magnolia Country Club	TRIB, HORSEHEAD CR, DORCHEAT BAYOU, RED R	11140203	1A
AR0047627	SMI Steel – Arkansas	DITCH, HURRICANE CR, BAYOU DORCHEAT	11140203	1A
AR0047635	Albemarle Corp – West Plant	DISMUKES BR, BIG CR, BAYOU DORCHEAT	11140203	1A
AR0047953	Deltic Farm & Timber – Waldo Mil	TRIB, BEECH CR, LAKE COLUMBIA	11140203	1A
AR0048054	Quad Hardwood Products	TRIB, BIG CR, DORCHEAT BAYOU, RED R	11140203	1A
AR0048305	Stamps, City of – South WTF	DITCH, BODCAU CR	11140205	1A

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	7.59	4.13	17.38	2.24
BOD_5 (mg/L)	51	1.42	0.53	2.88	0.53
pH (standard units)	51	6.29	5.38	7.56	0.46
Total Organic Carbon (mg/L)	49	13.09	4.62	20.11	2.92
Ammonia as N (mg/L)	53	0.03	<0.005	0.14	0.03
NO_2+NO_3 as N (mg/L)	53	0.11	<0.01	0.77	0.14
Orthophosphate as P (mg/L)	53	0.04	0.005	0.23	0.03
Total phosphorus as P (mg/L)	48	0.11	0.026	0.27	0.05
Total hardness (mg/L)	26	17.55	9	34.00	6.70
Chloride (mg/L)	53	20.36	7.07	55.36	10.40
Sulfate (mg/L)	53	20.89	3.18	172.00	33.96
Total dissolved solids (mg/L)	39	113.79	52	323.00	54.27
Total suspended solids (mg/L)	38	4.01	<1.0	13.20	2.85
Turbidity (NTU)	51	11.42	2.1	72.70	10.50

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	6.79	3.50	15.30	2.22
BOD_5 (mg/L)	55	1.68	0.56	4.61	0.87
pH (standard units)	56	6.19	5.23	7.32	0.43
Total Organic Carbon (mg/L)	53	13.35	6.9	21.02	3.16
Ammonia as N (mg/L)	58	0.04	<0.005	0.28	0.05
NO_2+NO_3 as N (mg/L)	58	0.08	<0.01	0.39	0.08
Orthophosphate as P (mg/L)	58	0.04	<0.005	0.09	0.02
Total phosphorus as P (mg/L)	54	0.14	0.023	0.32	0.06
Total hardness (mg/L)	29	17.11	9	33.10	6.16
Chloride (mg/L)	58	19.25	5.9	98.00	14.41
Sulfate (mg/L)	58	6.06	1.9	117.00	14.97
Total dissolved solids (mg/L)	43	101.31	50	258.00	35.36
Total suspended solids (mg/L)	42	5.11	<1.0	16.50	4.02
Turbidity (NTU)	55	13.21	3.3	55.60	10.49

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

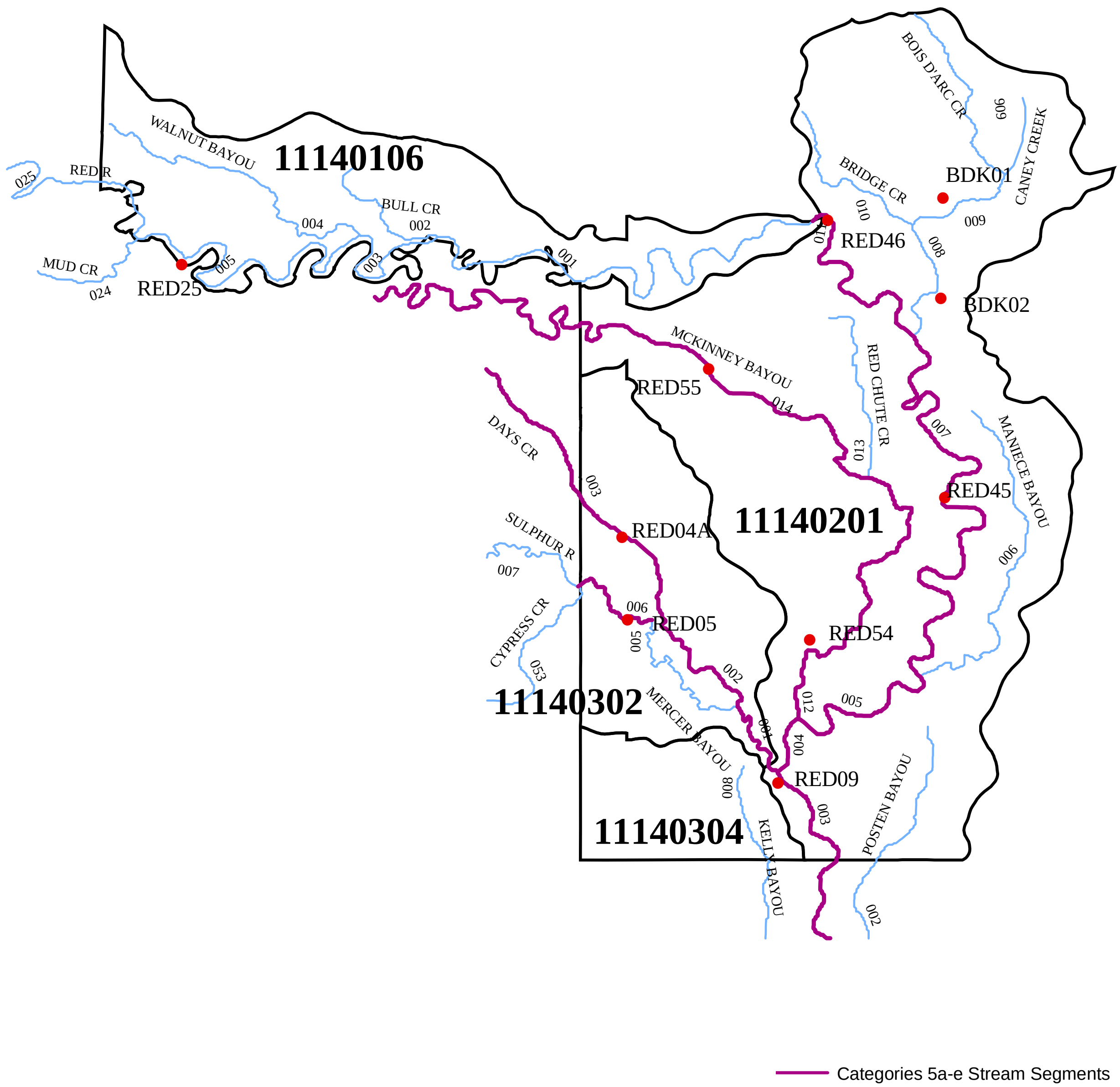
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial and agricultural water supplies. Monitored data were used as the basis of assessing 187.6 miles of stream within the segment. An additional 152.5 miles of stream were evaluated bringing the total miles of assessed streams within this segment to 339.8. Monitored data on the Red River near its entrance into Arkansas clearly indicate that the total dissolved solids 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.

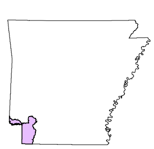
Data trends for Days Creek reveal major water quality improvements in the creek as a result of the City of Texarkana's improvement of its WWTF. Unfortunately, the creek is not meeting the drinking water designated use due to high nitrate levels.

The drinking water designated use has been removed from Bois d'Arc Creek due to the high mineral content in its upper reaches.

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 44 NTU (page A-19). Turbidity concentrations the past five years have routinely been above the instream "all 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 unknown at this time.

Figure A-3: Planning Segment 1B – Monitoring Stations



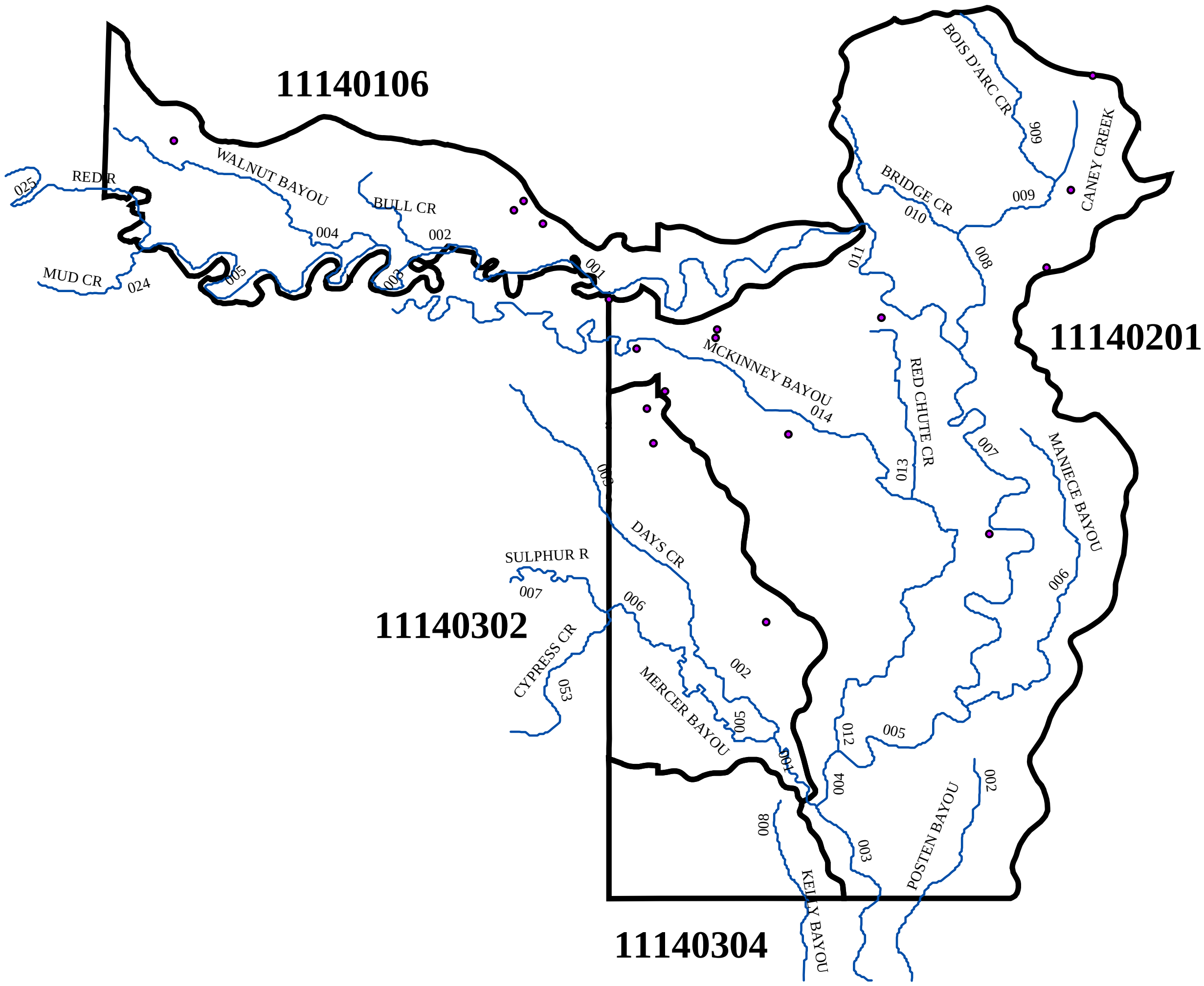


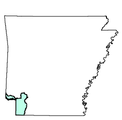
(Segment 1B)

Table A-5: Planning Segment 1B—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-1B																										
Red River	11140201	-011	15.2	RED46	M	S	S	S	S	N	N	UN				TDS				5a				FISH CONSUMPTION	340.1	0
Red River	11140201	-007	40.1	RED45	M	S	S	S	S	N	N	UN				TDS				5a				AQUATIC LIFE	317.3	22.8
Red River	11140201	-005	12		E	S	S	S	S	N	N	UN				TDS				5a				SWIMMING	340.1	0
Red River	11140201	-004	4		E	S	S	S	S	N	N	UN				TDS				5a				SECONDARY CONTACT	340.1	0
Red River	11140201	-003	15.5	RED09	M	S	S	S	S	N	N	UN				TDS				5a				DRINKING SUPPLY	90.4	142.5
Posten Bayou	11140201	-002	18.7		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	208.6	131.5
Maniece Bayou	11140201	-006	24.2		U															3						
Bois D'Arc Cr.	11140201	-008	8.9	BDK02	M	S	S	S	S	R	S									1						
Bois D'Arc Cr.	11140201	-009	20.4	BDK01	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	RED54	M	S	S	S	S	N	N	UN	UN			TDS	SO4			5a	5d					
McKinney Bayou	11140201	-014	21.6	RED55	M	S	S	S	S	N	N	UN	UN			TDS	SO4			5a	5d					
Red Chute Creek	11140201	-013	12.5		U															3						
Sulphur River	11140302	-001	6.3		E	S	N	S	S	S	S	UN				SI				5a						
Sulphur River	11140302	-002	8.5		E	S	N	S	S	S	S	UN				SI				5a						
Sulphur River	11140302	-004	0.7		E	S	N	S	S	S	S	UN				SI				5a						
Sulphur River	11140302	-006	6.5	RED05	M	S	N	S	S	S	S	UN				SI				5a						
Sulphur River	11140302	-008	0.8		E	S	N	S	S	S	S	UN				SI				5a						
Days Creek	11140302	-003	11	RED04A	M	S	S	S	S	N	S	MP				NO3				5a						
Mercer Bayou	11140302	-005	12.8		U															3						
Red River	11140106	-001	34.8		E	S	S	S	S	R	S									1						
Red River	11140106	-003	9.8		E	S	S	S	S	R	S									1						
Red River	11140106	-005	25.3	RED25	M	S	S	S	S	R	S									1						
Red River	11140106	-025	8		E	S	S	S	S	R	S									1						
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																									

Figure A-4: Planning Segment 1B – NPDES Permitted Facilities





(Segment 1B)

Table A-6: Segment 1B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0002968	Domtar A W Corp – Ashdown Operations	RED R	11140106	1B
AR0021326	Hudson Foods Inc. – Hope	DITCH, CANEY CR, BOIS D’ARC CR	11140201	1B
AR0038466	Hope, City of – Bois D’Arc WWTP	BLACK BR, BOIS D’ARC CR, RED R	11140201	1B
AR0038822	Cooper Tire & Rubber Co. – TexArk	DITCH, NIX CR, DAYS CR	11140302	1B
AR0041181	Garland, City of	RED R	11140201	1B
AR0041548	Fouke, City of	TRIB, CHICKEN CR, BOGGY CR	11140302	1B
AR0042897	Texarkana RV Park	BOIS D’ARC TRIB, FINN BAYOU	11140201	1B
AR0042951	Ashdown, City of	G.P. CANAL, RED R	11140106	1B
AR0043346	AR Hwy Dept – Red RV Tourist Ctr	RED R	11140106	1B
AR0044709	Flying J Travel Plaza #5021	TRIB, BOIS D’ARC BAYOU, RED R	11140201	1B
AR0046345	Spring Hill School	TRIB, FLAT BOIS D’ARC C, LITTLE BODCAW CR	11140201	1B
AR0046671	Celotex Corp – Texarkana Plant	TRIB;OAK,NIX,DAYS CRS	11140302	1B
AR0046795	Electric Cowboy of Texarkana	TRIB,MCKINNEY BAYOU	11140201	1B
AR0048348	Texarkana Timber Co.	TRIB, MILL CR, MCKINNEY BAYOU, RED R	11140201	1B
AR0048356	RVAF – Texarkana	RED R	11140201	1B
AR0048411	Domtar A W Corp – Woodlands Wet	TRIB, HUDSON CR, LITTLE R	11140106	1B
AR0048691	Texarkana, City of – North WWTP	MCKINNEY BAYOU, RED R	11140302	1B

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	52	8.14	4.08	18.74	2.29
BOD_5 (mg/L)	52	1.48	0.49	5.74	1.09
pH (standard units)	52	6.96	6.09	8.14	0.48
Total Organic Carbon (mg/L)	49	8.21	5.198	18.08	2.25
Ammonia as N (mg/L)	54	0.1	<0.005	0.32	0.06
NO_2+NO_3 as N (mg/L)	54	5.21	0.496	12.94	3.70
Orthophosphate as P (mg/L)	54	0.08	0.022	0.31	0.05
Total phosphorus as P (mg/L)	50	0.15	0.045	0.35	0.06
Total hardness (mg/L)	25	56.96	22	141.00	26.58
Chloride (mg/L)	54	35.15	6.47	82.78	17.82
Sulfate (mg/L)	54	28.1	7.61	54.20	13.13
Total dissolved solids (mg/L)	41	199.06	96.5	338.00	70.16
Total suspended solids (mg/L)	40	11.97	<1.0	209.00	33.03
Turbidity (NTU)	51	21.76	1.9	174.00	32.29

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
BOD_5 (mg/L)	57	2.66	0.57	4.88	1.19
pH (standard units)	58	7.23	5.98	8.58	0.50
Total Organic Carbon (mg/L)	55	10.06	6.2	24.50	3.16
Ammonia as N (mg/L)	60	0.09	<0.005	0.86	0.14
NO_2+NO_3 as N (mg/L)	60	0.12	<0.01	0.28	0.07
Orthophosphate as P (mg/L)	60	0.04	0.008	0.10	0.02
Total phosphorus as P (mg/L)	56	0.13	0.01	0.24	0.04
Total hardness (mg/L)	29	68.65	42	96.00	14.58
Chloride (mg/L)	60	15.44	3.31	49.10	10.34
Sulfate (mg/L)	60	23.96	7.51	70.50	15.61
Total dissolved solids (mg/L)	45	166.54	96	348.00	64.94
Total suspended solids (mg/L)	44	36.21	2.2	106.50	23.15
Turbidity (NTU)	57	34.22	5.7	135.00	20.65

Table A-9: RED0009 Red River Near Doddridge AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.68	4.49	14.28	1.99
BOD_5 (mg/L)	57	2.53	0.66	4.86	1.16
pH (standard units)	58	7.38	6.08	8.35	0.53
Total Organic Carbon (mg/L)	55	8.72	5.62	24.48	3.02
Ammonia as N (mg/L)	60	0.04	<0.005	0.24	0.05
NO_2+NO_3 as N (mg/L)	60	0.16	<0.01	0.49	0.11
Orthophosphate as P (mg/L)	60	0.03	<0.005	0.12	0.02
Total phosphorus as P (mg/L)	55	0.13	0.024	0.22	0.04
Total hardness (mg/L)	29	142.9	45	333.00	89.72
Chloride (mg/L)	60	85.14	3.91	719.00	115.22
Sulfate (mg/L)	60	75.31	8.45	258.00	60.35
Total dissolved solids (mg/L)	45	349.46	104	933.00	232.15
Total suspended solids (mg/L)	44	64.84	21	218.00	43.11
Turbidity (NTU)	57	46.98	6.25	135.00	28.64

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.11	5.76	17.35	2.03
BOD_5 (mg/L)	56	2.43	0.76	5.43	1.21
pH (standard units)	58	7.59	5.92	8.50	0.55
Total Organic Carbon (mg/L)	54	6.7	4.16	16.15	2.04
Ammonia as N (mg/L)	59	0.02	<0.005	0.13	0.03
NO_2+NO_3 as N (mg/L)	59	0.13	<0.01	0.55	0.15
Orthophosphate as P (mg/L)	59	0.02	<0.005	0.10	0.02
Total phosphorus as P (mg/L)	55	0.12	0.032	0.26	0.05
Total hardness (mg/L)	29	193.08	52	340.00	92.25
Chloride (mg/L)	57	143.74	9.19	2100.00	274.97
Sulfate (mg/L)	58	112.42	13	383.00	69.72
Total dissolved solids (mg/L)	44	470.35	104	1317.00	260.74
Total suspended solids (mg/L)	43	64.51	12	270.60	53.72
Turbidity (NTU)	56	51.21	8.2	265.00	49.07

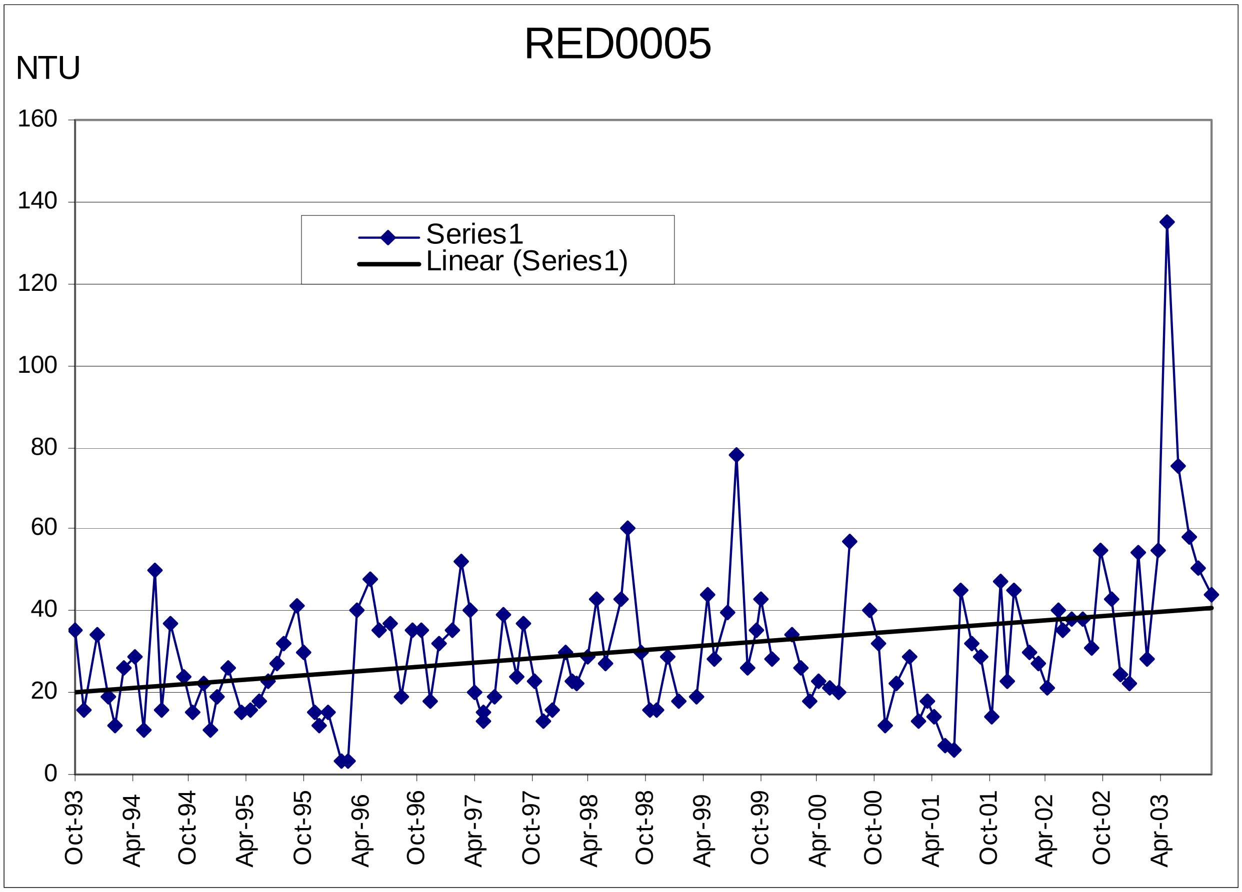
Table A-11: RED0045 Red River at Hwy 82 Bridge Near Garland AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	9.1	6.66	18.58	2.15
BOD_5 (mg/L)	57	2.41	0.79	5.28	1.23
pH (standard units)	58	7.41	5.92	8.85	0.61
Total Organic Carbon (mg/L)	55	7.44	4.45	19.84	2.30
Ammonia as N (mg/L)	60	0.03	<0.005	0.20	0.04
NO_2+NO_3 as N (mg/L)	60	0.13	<0.01	0.50	0.13
Orthophosphate as P (mg/L)	60	0.03	<0.005	0.10	0.02
Total phosphorus as P (mg/L)	55	0.14	0.01	0.82	0.10
Total hardness (mg/L)	1	151	151	151.00	
Chloride (mg/L)	60	124	5.06	1120.00	188.72
Sulfate (mg/L)	60	93.46	10.5	298.00	65.45
Total dissolved solids (mg/L)	45	404.09	104	1078.00	248.48
Total suspended solids (mg/L)	44	86.3	14	1305.00	195.53
Turbidity (NTU)	57	54.51	10	400.00	63.40

Table A-12: RED0046 Red River at Fulton AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	8.91	5.62	17.36	2.20
BOD_5 (mg/L)	56	2.37	0.80	6.21	1.24
pH (standard units)	57	7.42	6.04	9.22	0.61
Total Organic Carbon (mg/L)	54	7.25	4.995	21.82	2.49
Ammonia as N (mg/L)	59	0.02	<0.005	0.13	0.03
NO_2+NO_3 as N (mg/L)	59	0.13	<0.01	0.55	0.13
Orthophosphate as P (mg/L)	59	0.02	<0.005	0.11	0.02
Total phosphorus as P (mg/L)	55	0.13	0.03	0.76	0.10
Total hardness (mg/L)	2	107.5	66	149.00	58.69
Chloride (mg/L)	57	116.21	8.3	1460.00	195.50
Sulfate (mg/L)	58	97.28	9.47	356.00	72.59
Total dissolved solids (mg/L)	44	426.44	81.5	1217.00	275.20
Total suspended solids (mg/L)	43	51.83	11	236.00	40.53
Turbidity (NTU)	56	45.46	4.2	167.00	34.96

Figure A-5: Sulphur River Turbidity Trend Analysis



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SEGMENT 1C LITTLE RIVER AND TRIBUTARIES

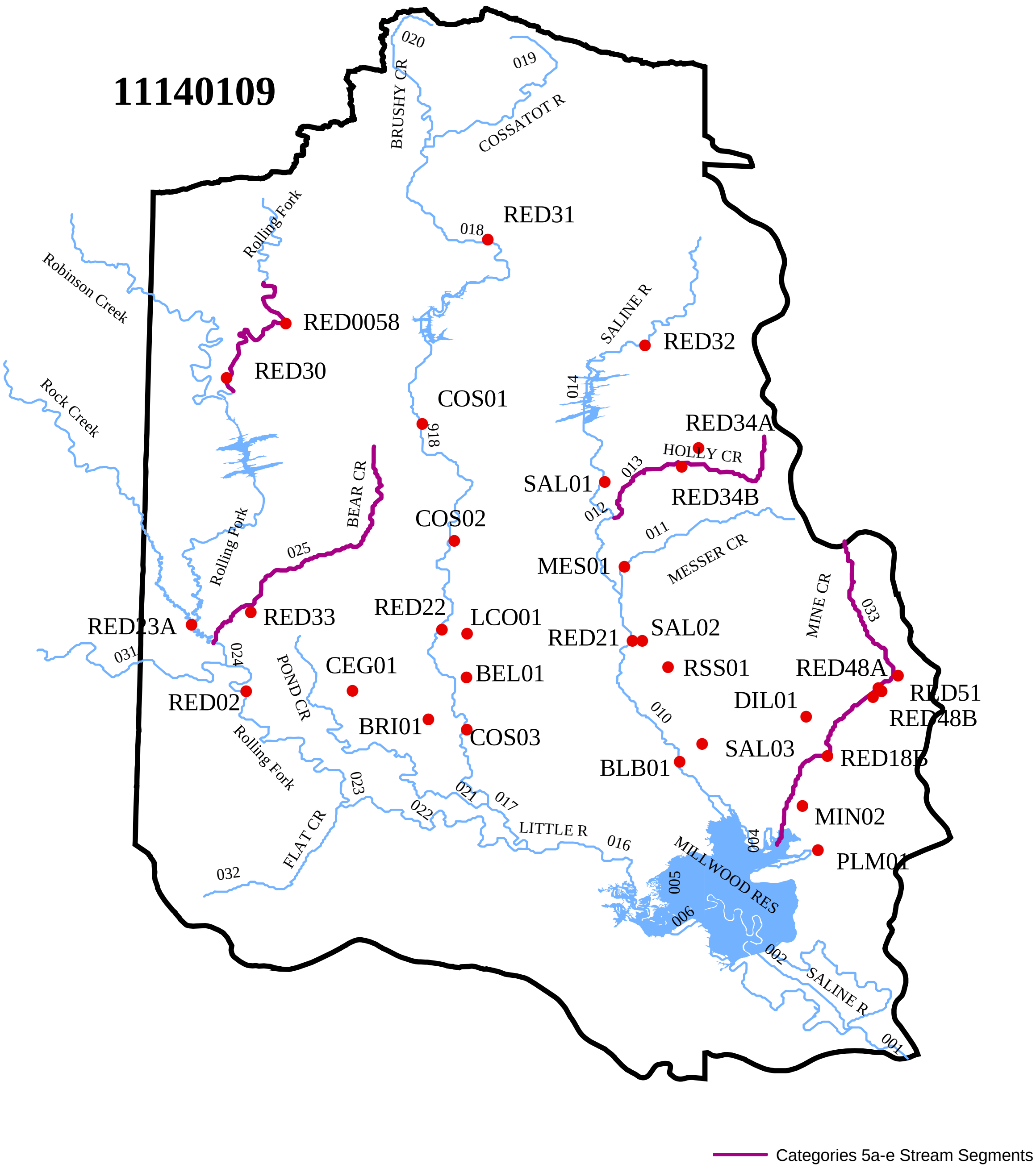
Segment 1C is located in southwest Arkansas north of Texarkana and includes all of Sevier County and parts of Polk, Howard, Hempstead and Little River counties. This includes the entire reach of the Little River in Arkansas from its point of entrance into the State to its confluence with the Red River. 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.

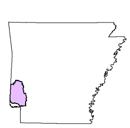
Summary of Water Quality Conditions

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 206 miles of stream within this segment. An additional 124.9 miles were evaluated bring the total number of miles assessed with in this segment to 330.9 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 pathogen contamination originating from the city WWTF and/or Weyerhaeuser, Inc. discharges. Additionally, upstream from these discharges very high turbidity values have occurred on rare occasions. The source is unknown, but it appears to be from a major storm event flow. 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 and is currently being listed as not attaining its drinking water use due to excessive nitrates. Similarly, Mine Creek has elevated nutrients and metals (copper and zinc) discharged from the Tyson, Inc., plant at Nashville and the City of Nashville's discharge.

The Rolling Fork River above DeQueen Reservoir has significantly elevated nutrient concentrations (see charts on page A-33).

Figure A-6: Planning Segment 1C – Monitoring Stations



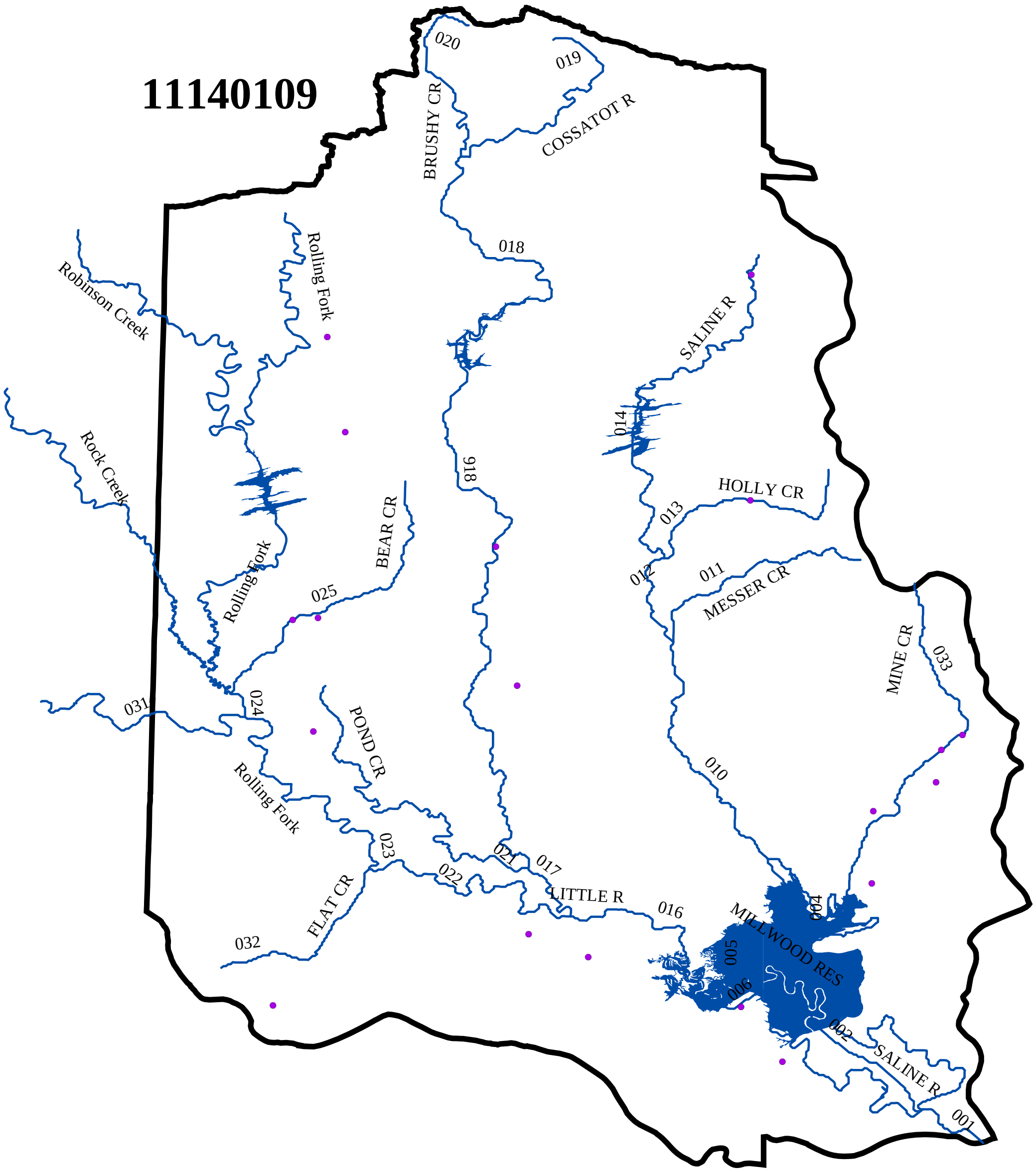


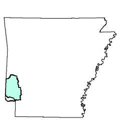
(Segment 1C)

Table A-13: Planning Segment 1C—Designated Use Attainment Status

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	330.9	0
Saline River	11140109	-010	15.2	RED21	M	S	S	S	S	S	S									1				AQUATIC LIFE	296	34.9
Saline River	11140109	-012	6.1		E	S	S	S	S	S	S									1				PRIMARY CONTACT	296.1	34.8
Messer Creek	11140109	-011	12.6		E	S	S	S	S	S	S									1				SECONDARY CONTACT	330.9	0
Holly Creek	11140109	-013	12.7	RED34A&B	M	S	S	N	S	S	S	MP	IP			PA	PA			5d	5d			DRINKING SUPPLY	291.5	17.3
Saline River	11140109	-014	15.3	RED32	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	308.8	22.1
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	RED31	M	S	S	S	S	S	S									1						
Cossatot R.	11140109	-918	37.2	RED22	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	RED02	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	RED33	M	S	S	S	S	N	S	MP				NO3				5a						
Rolling Fork	11140109	-026	2.7	RED23A	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	RED30&58	M	S	N	S	S	S	S	IP	IP	IP		NO3	TP	Cu		5a	5a	5a				
Rolling Fork	11140109	-028	8.3		M	S	S	S	S	S	S									1						
Robinson Creek	11140109	-029	25.6		M	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	-033	22.1	RED48B+	M	S	N	N	S	R	N	IP	IP	IP	IP	Cu	SO4	Zn	PA	5a	5b	5c	5d			
TOTAL MILES	369.8																									
MILES UNASSESSED	38.9																									
MILES EVALUATED	124.9																									
MILES MONITORED	206																									

Figure A-7: Planning Segment 1C – NPDES Permitted Facilities





(Segment 1C)

Table A-14: Segment 1C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0002909	Weyerhaeuser Co – DeQueen Wood T	BEAR CR,ROLLING FORK, LITTLE RED R	11140109	1C
AR0002917	Weyerhaeuser Co – Dierks	HOLLY CR	11140109	1C
AR0003018	Tyson Foods Inc – Grannis	TRIB-ROLLING FORK R,1C-RED R BASIN	11140109	1C
AR0021261	Mineral Springs, City of	MINE CR,LITTLE R	11140109	1C
AR0021377	Lockesburg, City of	LITTLE COSSATOT R TRIB	11140109	1C
AR0021709	Dierks, City of	HOLLY CR	11140109	1C
AR0021733	DeQueen, City of	BIG BEAR CR	11140109	1C
AR0021776	Nashville, City of	MINE CR,MILLWOOD LAKE,LITTLE R,RED R	11140109	1C
AR0023817	Foreman, City of	EAST FLAT CR	11140109	1C
AR0035785	Horatio, City of	TRIB,POND CR,COSSATOT R, LITTLE R	11140109	1C
AR0037079	AR Parks & Tourism – Millwood	DITCH,BUSTER CR	11140109	1C
AR0040886	Wilton, City of	LICK CR	11140109	1C
AR0041246	Millwood Water Corp.	TRIB (MILLWOOD LAKE), LITTLE R, RED R	11140109	1C
AR0041734	Tyson Foods Inc. – Nashville	MINE CR, MILLWOOD LAKE	11140109	1C
AR0041769	Dalton MHP	TRIB, MINE CR, MILLWOOD LAKE	11140109	1C
AR0042846	Ash Grove Cement Co	FRENCH CR,WALNUT BAYOU,RED R	11140109	1C
AR0045144	Tollette, City of	MINE CR,LITTLE R	11140109	1C
AR0047996	Gillham Regional WW Dist.	BELLAH CR, ROLLING FORK, LAKE DEQUEEN	11140109	1C
AR0048593	Bruce Kennedy Sand & Gravel	MILL SLOUGH BR,COSSATOT R	11140109	1C
AR0049034	Sevier County Aggregates, Inc.	SLOUGH, HAIL CR, COSSATOT R	11140109	1C
AR0049379	Hanson Aggregates – Little River	LITTLE R TRIB	11140109	1C

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.67	4.70	12.53	1.97
BOD_5 (mg/L)	59	1.14	0.00	10.90	1.37
pH (standard units)	57	6.68	6.14	7.90	0.39
Total Organic Carbon (mg/L)	57	4.41	2.629	9.00	1.43
Ammonia as N (mg/L)	58	0.03	<0.005	0.12	0.03
NO_2+NO_3 as N (mg/L)	58	0.27	0.07	0.69	0.11
Orthophosphate as P (mg/L)	58	0.03	<0.005	0.11	0.02
Total phosphorus as P (mg/L)	54	0.07	0.01	0.19	0.04
Total hardness (mg/L)	30	16.98	10	29.00	4.77
Chloride (mg/L)	60	7.42	2.01	25.30	4.68
Sulfate (mg/L)	60	4.91	3.45	8.66	1.06
Total dissolved solids (mg/L)	47	51.57	30.5	79.50	10.94
Total suspended solids (mg/L)	46	13.76	<1.0	127.00	19.33
Turbidity (NTU)	59	14.42	1.8	57.00	12.03

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	7.89	3.57	12.30	2.21
BOD_5 (mg/L)	57	1.29	0.00	6.05	1.01
pH (standard units)	55	6.77	6.06	8.02	0.39
Total Organic Carbon (mg/L)	55	4.92	1.692	10.60	1.92
Ammonia as N (mg/L)	56	0.08	<0.005	0.28	0.06
NO_2+NO_3 as N (mg/L)	56	3.27	0.182	20.74	3.89
Orthophosphate as P (mg/L)	56	0.87	0.027	5.61	1.15
Total phosphorus as P (mg/L)	51	0.93	0.068	3.53	1.02
Total hardness (mg/L)	29	24.58	15	43.00	7.33
Chloride (mg/L)	58	21.25	3.48	81.50	20.91
Sulfate (mg/L)	58	29.27	6.46	111.04	28.45
Total dissolved solids (mg/L)	45	162.74	56.5	490.00	132.26
Total suspended solids (mg/L)	44	9.95	<1.0	56.50	9.49
Turbidity (NTU)	57	16.27	4.1	164.00	21.33

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.73	3.35	12.93	2.46
BOD_5 (mg/L)	60	1.16	0.00	5.04	0.94
pH (standard units)	58	6.57	4.84	8.30	0.51
Total Organic Carbon (mg/L)	58	6.09	3.225	14.20	2.45
Ammonia as N (mg/L)	59	0.04	<0.005	0.22	0.04
NO_2+NO_3 as N (mg/L)	59	0.38	<0.01	2.47	0.37
Orthophosphate as P (mg/L)	59	0.03	<0.005	0.20	0.03
Total phosphorus as P (mg/L)	55	0.09	0.01	0.41	0.07
Total hardness (mg/L)	31	17.9	<1.0	32.00	6.16
Chloride (mg/L)	61	2.99	1.71	6.36	0.73
Sulfate (mg/L)	61	5.06	2.91	12.30	2.21
Total dissolved solids (mg/L)	48	55.36	37	100.50	14.69
Total suspended solids (mg/L)	47	13.34	1	171.50	28.06
Turbidity (NTU)	60	17.9	3.4	150.00	22.06

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.52	4.97	12.87	2.09
BOD_5 (mg/L)	59	0.9	0.00	2.30	0.49
pH (standard units)	57	6.61	6.15	7.87	0.38
Total Organic Carbon (mg/L)	57	3.99	2.48	11.00	1.61
Ammonia as N (mg/L)	58	0.03	<0.005	0.69	0.09
NO_2+NO_3 as N (mg/L)	58	0.23	<0.01	0.78	0.19
Orthophosphate as P (mg/L)	58	0.02	<0.005	0.07	0.01
Total phosphorus as P (mg/L)	54	0.05	0.01	0.18	0.04
Total hardness (mg/L)	30	12.28	9	19.00	2.48
Chloride (mg/L)	60	2.23	1.53	3.81	0.41
Sulfate (mg/L)	60	3.82	2.37	5.67	0.64
Total dissolved solids (mg/L)	47	41.17	28	65.00	7.67
Total suspended solids (mg/L)	46	8.54	1	41.00	8.94
Turbidity (NTU)	59	11.53	2.6	62.00	9.73

Table A-19: RED0023A Rolling Fork River @ County Road Bridge 1 1/2 Mi N. Hwy 24

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.23	4.04	12.86	2.00
BOD_5 (mg/L)	59	0.89	0.00	3.09	0.56
pH (standard units)	57	6.58	4.34	7.70	0.45
Total Organic Carbon (mg/L)	57	4.56	2.95	11.00	1.72
Ammonia as N (mg/L)	58	0.03	<0.005	0.26	0.04
NO_2+NO_3 as N (mg/L)	58	0.26	<0.01	1.05	0.20
Orthophosphate as P (mg/L)	58	0.03	<0.005	0.09	0.02
Total phosphorus as P (mg/L)	54	0.07	0.01	0.31	0.05
Total hardness (mg/L)	30	12.86	7	22.00	2.84
Chloride (mg/L)	60	5.16	2.09	12.18	2.38
Sulfate (mg/L)	60	3.93	2.49	5.72	0.63
Total dissolved solids (mg/L)	47	45.61	33.5	66.00	7.71
Total suspended solids (mg/L)	46	8.1	<1.0	57.80	11.31
Turbidity (NTU)	59	11.55	1.4	88.00	14.64

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	10.48	4.70	15.59	2.13
BOD_5 (mg/L)	57	1.37	0.04	9.76	1.69
pH (standard units)	56	7.42	6.14	9.94	0.96
Total Organic Carbon (mg/L)	56	4.46	1.8	13.50	2.56
Ammonia as N (mg/L)	59	0.01	<0.005	0.06	0.01
NO_2+NO_3 as N (mg/L)	59	4.76	0.014	43.70	11.53
Orthophosphate as P (mg/L)	59	2.43	0.005	9.29	2.88
Total phosphorus as P (mg/L)	55	2.55	0.01	11.53	3.05
Total hardness (mg/L)	31	22.96	<1.0	100.00	17.72
Chloride (mg/L)	61	13.51	1.82	54.20	14.96
Sulfate (mg/L)	61	9.65	3.28	32.90	6.99
Total dissolved solids (mg/L)	47	130.28	26	673.00	148.88
Total suspended solids (mg/L)	47	4.48	<1.0	36.00	5.98
Turbidity (NTU)	59	5.58	1.7	17.00	3.44

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.36	5.07	16.12	2.52
BOD_5 (mg/L)	57	0.36	0.00	1.57	0.29
pH (standard units)	57	6.87	6.11	7.86	0.38
Total Organic Carbon (mg/L)	56	1.86	<1.0	5.20	0.77
Ammonia as N (mg/L)	58	0.01	<0.005	0.03	0.01
NO_2+NO_3 as N (mg/L)	58	0.07	<0.01	0.44	0.07
Orthophosphate as P (mg/L)	58	0.01	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	54	0.02	0.01	0.07	0.02
Total hardness (mg/L)	30	17.78	7	31.00	7.36
Chloride (mg/L)	60	1.81	0.26	3.29	0.40
Sulfate (mg/L)	60	4.85	0.35	8.17	1.37
Total dissolved solids (mg/L)	47	38.17	23.5	61.00	8.84
Total suspended solids (mg/L)	47	1.02	<1.0	4.00	0.85
Turbidity (NTU)	59	3.01	<1.0	12.00	2.54

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	51	8.07	6.10	11.30	1.01
BOD_5 (mg/L)	58	0.91	0.16	5.70	0.79
pH (standard units)	57	7.01	6.05	8.00	0.29
Total Organic Carbon (mg/L)	51	3.41	1.8	9.80	1.24
Ammonia as N (mg/L)	60	0.03	<0.005	0.27	0.04
NO_2+NO_3 as N (mg/L)	60	0.57	<0.01	2.19	0.54
Orthophosphate as P (mg/L)	60	0.02	<0.005	0.09	0.02
Total phosphorus as P (mg/L)	57	0.05	0.01	0.21	0.04
Total hardness (mg/L)	28	14.82	10	27.00	3.85
Chloride (mg/L)	60	2.87	1.76	4.19	0.49
Sulfate (mg/L)	59	3.09	1.09	5.00	0.81
Total dissolved solids (mg/L)	48	43.73	32	58.00	6.80
Total suspended solids (mg/L)	47	3.27	<1.0	21.00	3.62
Turbidity (NTU)	59	7.49	1.1	61.00	8.63

Table A-23: RED0033 Bear Cr. Downst. of Weyerhaeuser NPDES Discharges, Process City, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	31	7.83	2.90	13.85	2.40
BOD_5 (mg/L)	33	1.25	0.12	5.86	1.15
pH (standard units)	33	6.82	6.12	7.57	0.43
Total Organic Carbon (mg/L)	31	6.04	2.2	7.97	1.35
Ammonia as N (mg/L)	33	0.52	<0.005	4.06	0.96
NO_2+NO_3 as N (mg/L)	33	5.65	0.495	22.10	5.79
Orthophosphate as P (mg/L)	33	0.04	<0.005	0.25	0.05
Total phosphorus as P (mg/L)	27	0.09	0.01	0.28	0.06
Total hardness (mg/L)	17	76.47	17	222.00	59.44
Chloride (mg/L)	33	28.25	2.74	67.16	22.78
Sulfate (mg/L)	33	37.28	5.49	99.70	28.83
Total dissolved solids (mg/L)	21	193.02	49.5	489.00	141.97
Total suspended solids (mg/L)	21	6.17	<1.0	20.30	5.42
Turbidity (NTU)	33	10.35	2.4	27.00	7.36

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	45	7.38	5.30	11.20	1.03
BOD_5 (mg/L)	50	0.93	0.30	2.62	0.56
pH (standard units)	49	7.06	5.98	8.20	0.28
Total Organic Carbon (mg/L)	46	5.39	2.91	14.50	2.12
Ammonia as N (mg/L)	51	0.03	<0.005	0.19	0.04
NO_2+NO_3 as N (mg/L)	51	0.38	0.041	1.29	0.27
Orthophosphate as P (mg/L)	51	0.02	<0.005	0.21	0.03
Total phosphorus as P (mg/L)	49	0.05	0.01	0.44	0.07
Total hardness (mg/L)	23	13.43	8	20.00	3.01
Chloride (mg/L)	51	3.23	1.61	17.20	2.07
Sulfate (mg/L)	50	4.14	2.59	5.73	0.91
Total dissolved solids (mg/L)	40	47.15	33	73.50	8.41
Total suspended solids (mg/L)	39	3.4	<1.0	14.50	2.87
Turbidity (NTU)	50	12.36	2.2	46.00	8.61

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	49	6.88	5.20	10.90	0.93
BOD_5 (mg/L)	55	1.66	0.39	4.29	0.94
pH (standard units)	55	7.02	6.12	7.49	0.21
Total Organic Carbon (mg/L)	49	7.54	3.03	16.70	2.77
Ammonia as N (mg/L)	57	0.17	<0.005	1.00	0.17
NO_2+NO_3 as N (mg/L)	57	0.44	0.028	1.32	0.25
Orthophosphate as P (mg/L)	57	0.08	<0.005	0.32	0.07
Total phosphorus as P (mg/L)	54	0.15	0.01	0.46	0.12
Total hardness (mg/L)	26	28	14	62.00	11.60
Chloride (mg/L)	57	8.17	2	41.90	7.29
Sulfate (mg/L)	56	5.11	2.7	12.06	1.78
Total dissolved solids (mg/L)	47	85.9	42	175.00	33.81
Total suspended solids (mg/L)	46	4.77	<1.0	22.30	3.64
Turbidity (NTU)	56	13.55	3.6	84.00	11.69

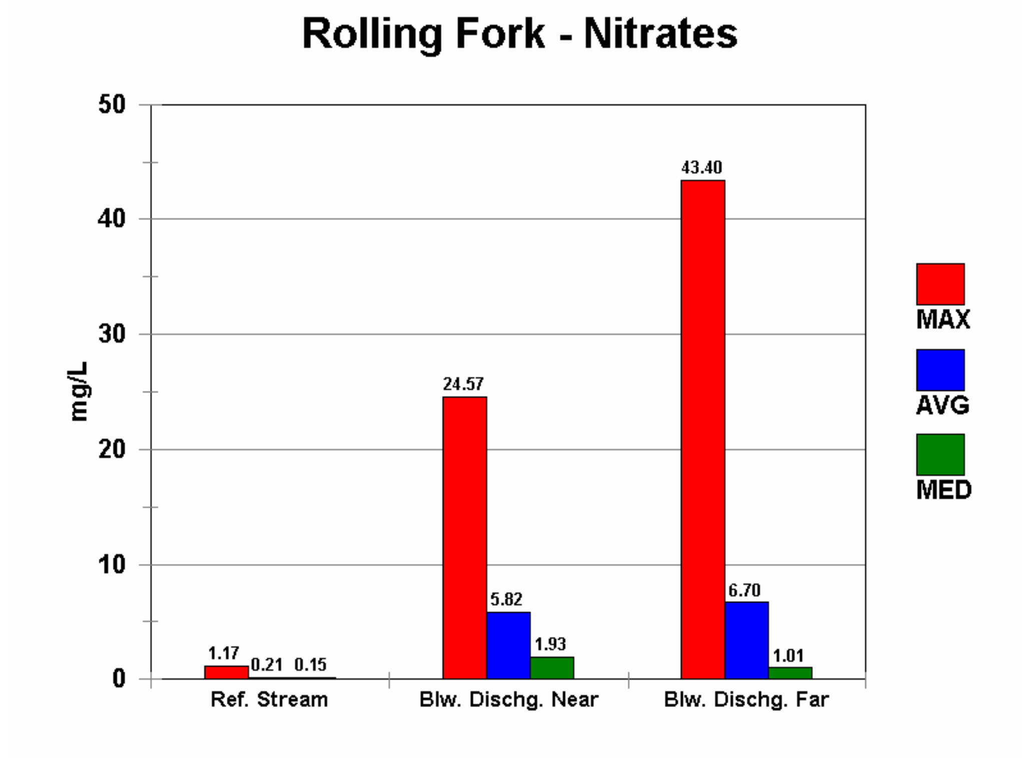
Table A-26: RED0048B Mine Creek Southeast of Nashville (MNC01B)

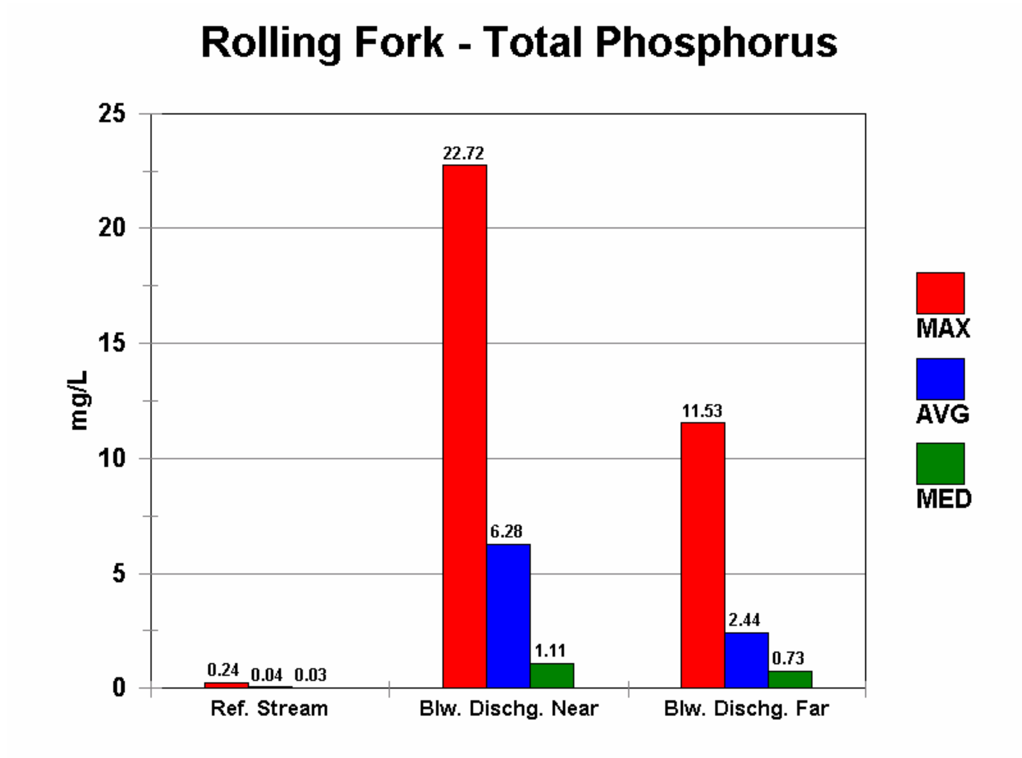
Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	64	7.02	1.15	12.00	2.71
BOD_5 (mg/L)	64	1.52	0.00	5.84	1.09
pH (standard units)	63	6.93	5.90	9.78	0.61
Total Organic Carbon (mg/L)	63	5.16	1.982	15.45	2.27
Ammonia as N (mg/L)	63	0.12	<0.005	0.91	0.14
NO_2+NO_3 as N (mg/L)	63	4.9	0.181	22.20	5.33
Orthophosphate as P (mg/L)	63	2.2	0.073	9.35	2.26
Total phosphorus as P (mg/L)	59	2.35	0.106	10.00	2.41
Total hardness (mg/L)	36	28.63	14	50.00	9.54
Chloride (mg/L)	66	29.06	3.17	87.40	23.25
Sulfate (mg/L)	66	34.86	5.44	120.00	26.31
Total dissolved solids (mg/L)	53	206.04	55.5	640.00	148.26
Total suspended solids (mg/L)	52	8.9	<1.0	65.30	10.04
Turbidity (NTU)	65	12.36	3	88.00	13.05

Table A-27: RED0058 Rolling Fork River West of Grannis, Arkansas

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	42	10.38	7.78	16.04	1.69
BOD_5 (mg/L)	44	0.9	0.11	6.15	0.92
pH (standard units)	45	7.15	6.22	8.24	0.56
Total Organic Carbon (mg/L)	42	4.1	1.602	9.72	2.23
Ammonia as N (mg/L)	43	0.02	<0.005	0.08	0.02
NO_2+NO_3 as N (mg/L)	44	4.27	0.23	24.57	5.58
Orthophosphate as P (mg/L)	43	5.78	0.126	27.52	7.44
Total phosphorus as P (mg/L)	39	5.95	0.135	22.72	7.43
Total hardness (mg/L)	23	29.05	10	80.00	18.85
Chloride (mg/L)	45	16.34	2.54	59.60	17.60
Sulfate (mg/L)	45	12.4	3.43	35.80	9.03
Total dissolved solids (mg/L)	32	139.28	37.5	549.00	128.65
Total suspended solids (mg/L)	32	13.62	<1.0	347.30	60.91
Turbidity (NTU)	44	11.3	1.6	280.00	41.54

Figure A-8: Red River Basin Comparison in the Rolling Fork River to Reference Stream





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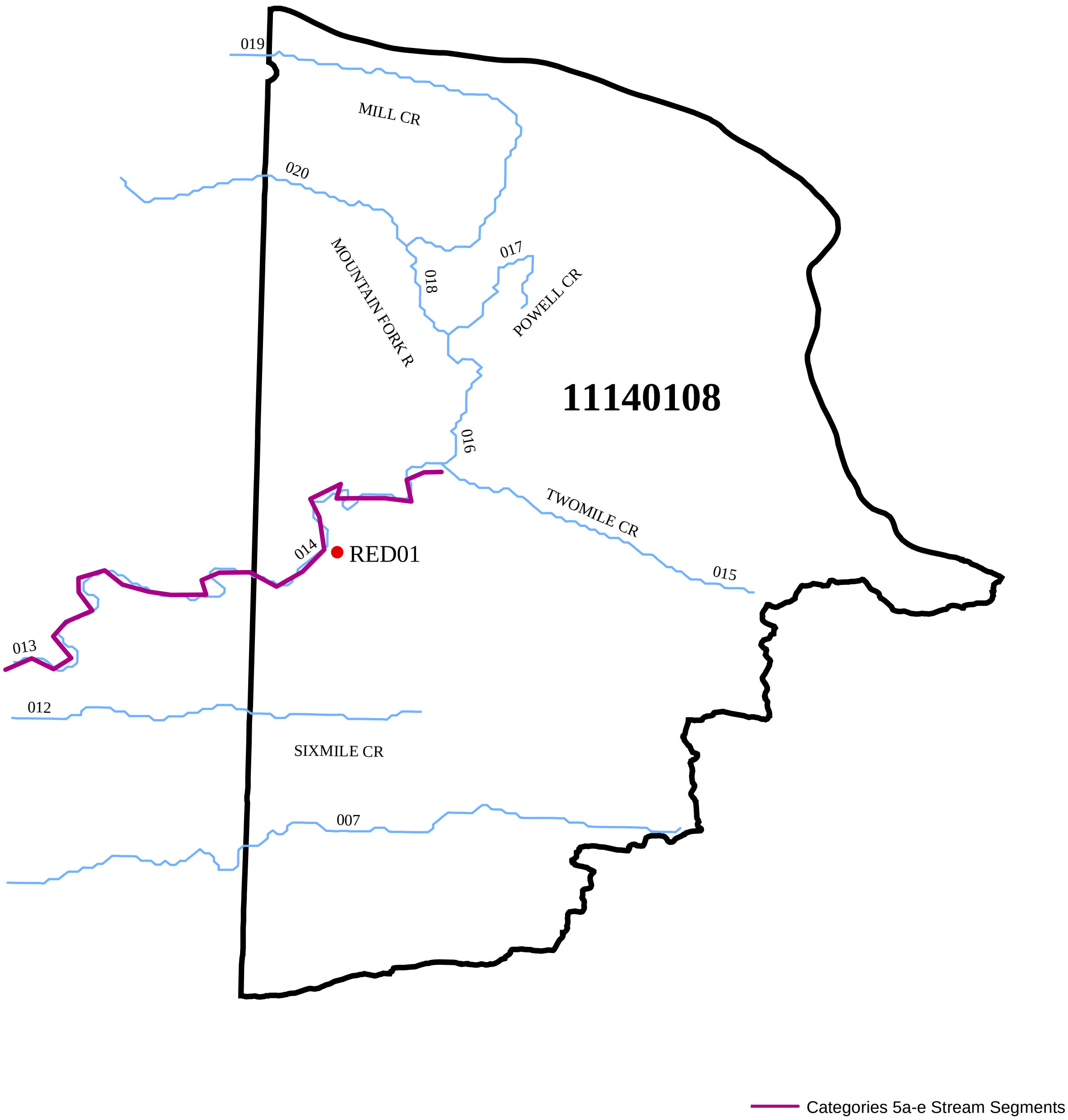
SEGMENT 1D MOUNTAIN FORK AND TRIBUTARIES

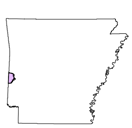
This segment is located on the western edge of Arkansas and covers a portion of Polk County. Basin Segment 1D encompasses a 20-mile reach of the Mountain Fork of Little River from its headwaters to the Arkansas-Oklahoma line.

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 and an ecologically sensitive waterbody due to 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 11.3 miles of Mountain Fork Little River was evaluated as meeting designated uses.

Figure A-9: Planning Segment 1D – Monitoring Stations



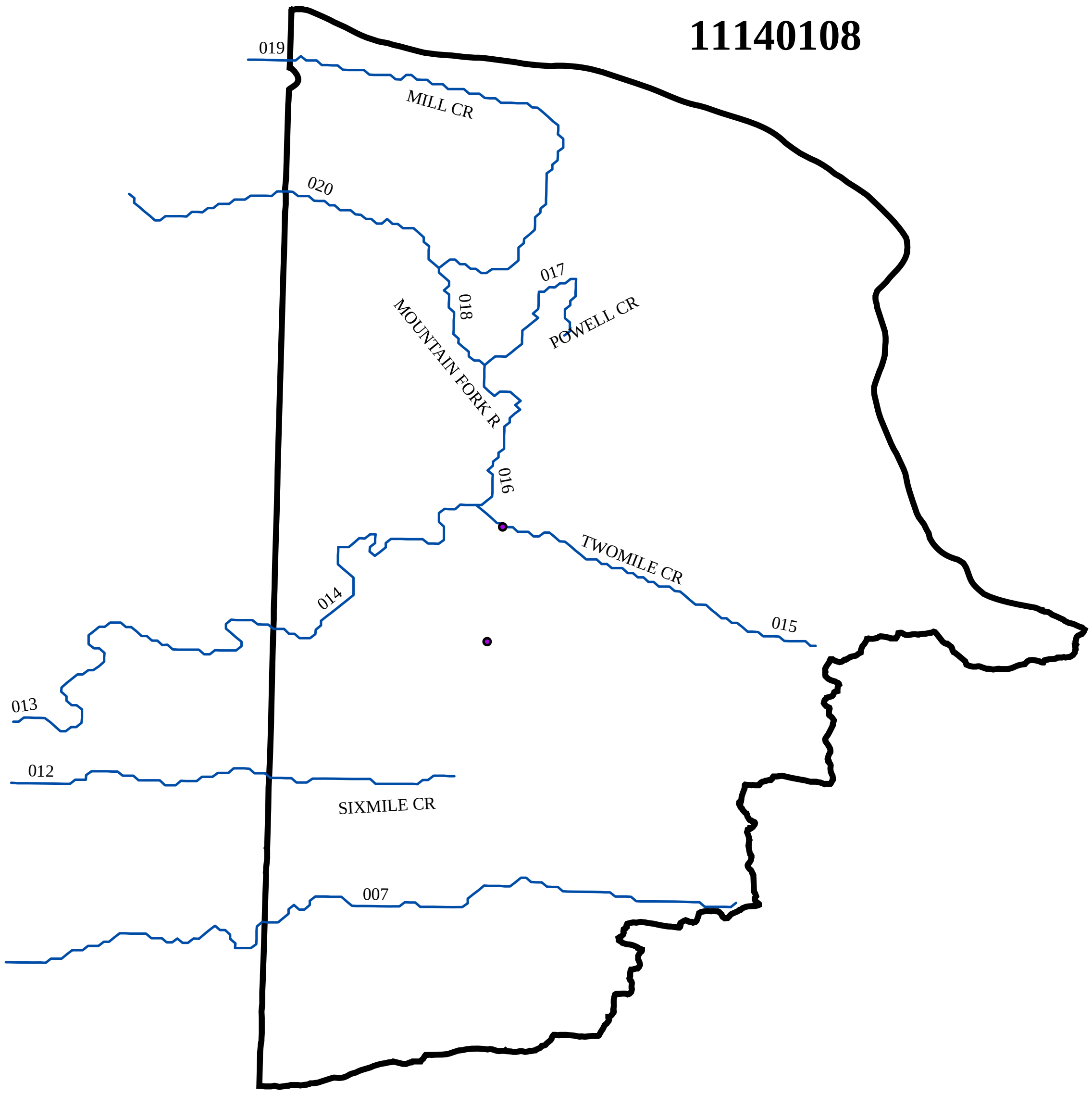


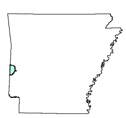
(Segment 1D)

Table A-28: Planning Segment 1D—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-1D																										
Buffalo Creek	11140108	-007	9.5		U															3				FISH CONSUMPTION	22.3	0
Sixmile Creek	11140108	-012	4.1		U															3				AQUATIC LIFE	11.3	11
Mountain Fork	11140108	-014	11	RED01	M	S	N	S	S	S	S	UN				Temp				5e				PRIMARY CONTACT	22.3	0
Twomile Creek	11140108	-015	8.1		U															3				SECONDARY CONTACT	22.3	0
Mountain Fork	11140108	-016	4.5		E	S	S	S	S	S	S									1				DRINKING SUPPLY	22.3	0
Mountain Fork	11140108	-018	2.8		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	22.3	0
Powell Creek	11140108	-017	4.7		U															3						
Mill Creek	11140108	-019	12.2		U															3						
Mountain Fork	11140108	-020	4		E	S	S	S	S	S	S									1						
TOTAL MILES	60.9																									
MILES UNASSESSED	38.6																									
MILES EVALUATED	11.3																									
MILES MONITORED	11																									

Figure A-10: Planning Segment 1D – NPDES Permitted Facilities





(Segment 1D)

Table A-29: Segment 1D Active NPDES Permits

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

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.77	4.26	14.19	1.89
BOD_5 (mg/L)	57	0.92	0.00	4.74	0.85
pH (standard units)	57	6.95	6.19	7.82	0.40
Total Organic Carbon (mg/L)	56	3.26	1.609	7.10	1.24
Ammonia as N (mg/L)	57	0.01	<0.005	0.23	0.03
NO_2+NO_3 as N (mg/L)	57	0.18	<0.01	1.17	0.23
Orthophosphate as P (mg/L)	57	0.03	<0.005	0.46	0.07
Total phosphorus as P (mg/L)	54	0.06	0.01	0.53	0.09
Total hardness (mg/L)	30	9.42	7	12.00	1.41
Chloride (mg/L)	60	2.38	0.26	4.83	0.59
Sulfate (mg/L)	60	3.18	2.1	5.48	0.64
Total dissolved solids (mg/L)	47	35.29	23	60.00	6.49
Total suspended solids (mg/L)	47	3.63	<1.0	23.00	4.55
Turbidity (NTU)	59	9.26	1.9	44.70	8.56

Ouachita River Basin

SEGMENT 2A BOEUF RIVER AND TRIBUTARIES

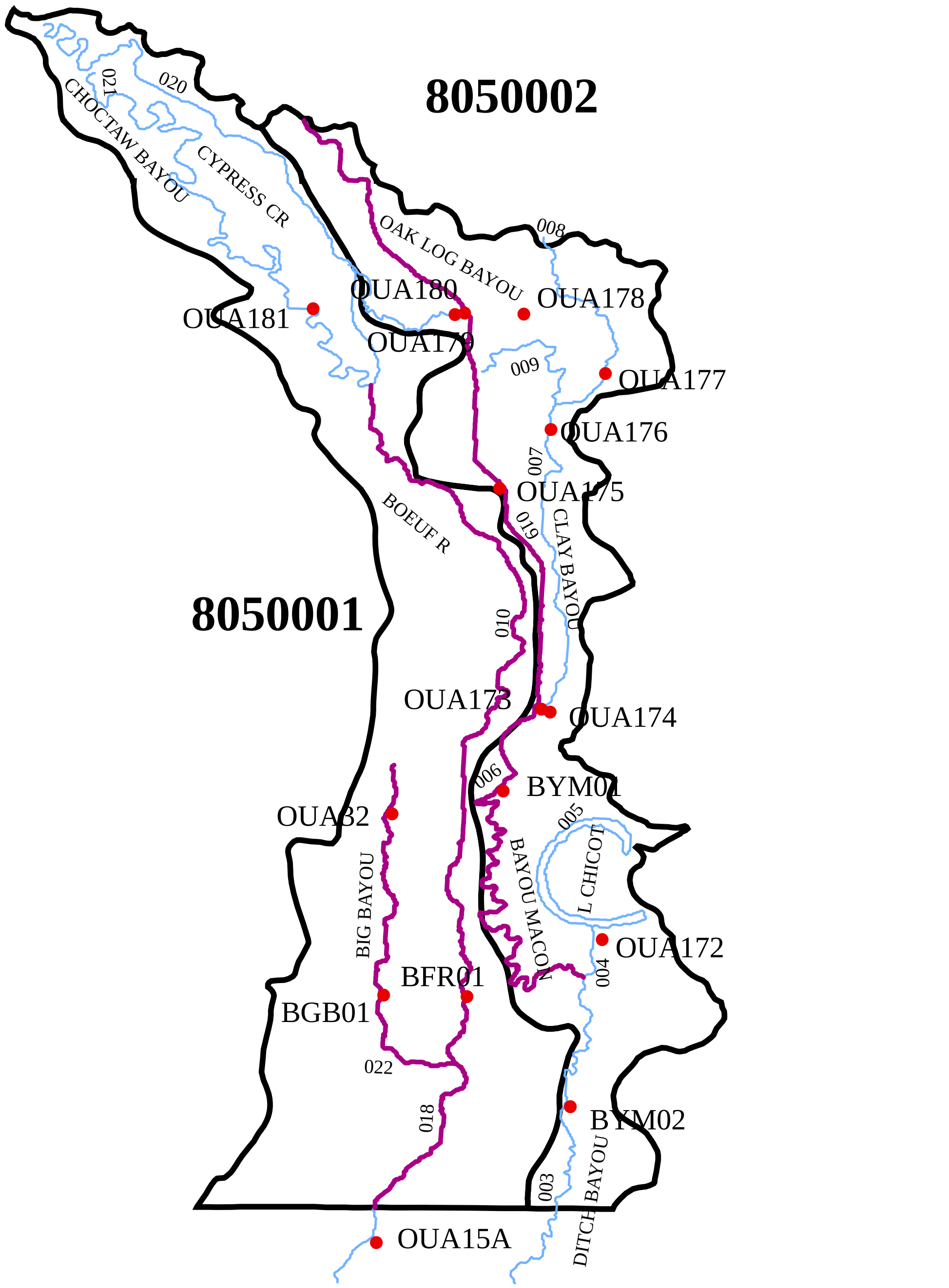
This segment is located in the extreme southeastern corner of Arkansas. It includes most of Chicot and Desha Counties, the northeastern part of Lincoln County, and small areas of Drew, Ashley and Jefferson Counties. Major streams within this segment include the Boeuf River and its tributaries - Macon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

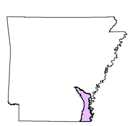
Summary of Water Quality Conditions

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 453.8 miles of stream within this segment. An additional 12 miles were evaluated bring the total number of miles assessed with in this segment to 465.8 stream miles. Data assessed from those reaches provided some indication that the aquatic life use may be impaired because of frequent and very high turbidity and suspended solids values. Bayou Macon, Big Bayou, Oak Bayou, and Boeuf River were assessed as not meeting the aquatic life use. It is clear that these conditions are caused by the runoff from intensive row crop agriculture which is the dominant land use within this segment. Elevated chlorides occur in lower Boeuf River and in Big Bayou; this is probably from discharges of irrigation water taken from deep aquifers.

All stations monitored within this segment exhibited multiple occurrences of pesticides (several pesticides and/or more than one occurrence of the same pesticide) which were above the analytical detection level. This was the highest rate of occurrence of pesticides within any segment of the State, although no water quality standard or drinking water maximum contaminant level was exceeded.

Figure A-11: Planning Segment 2A – Monitoring Stations



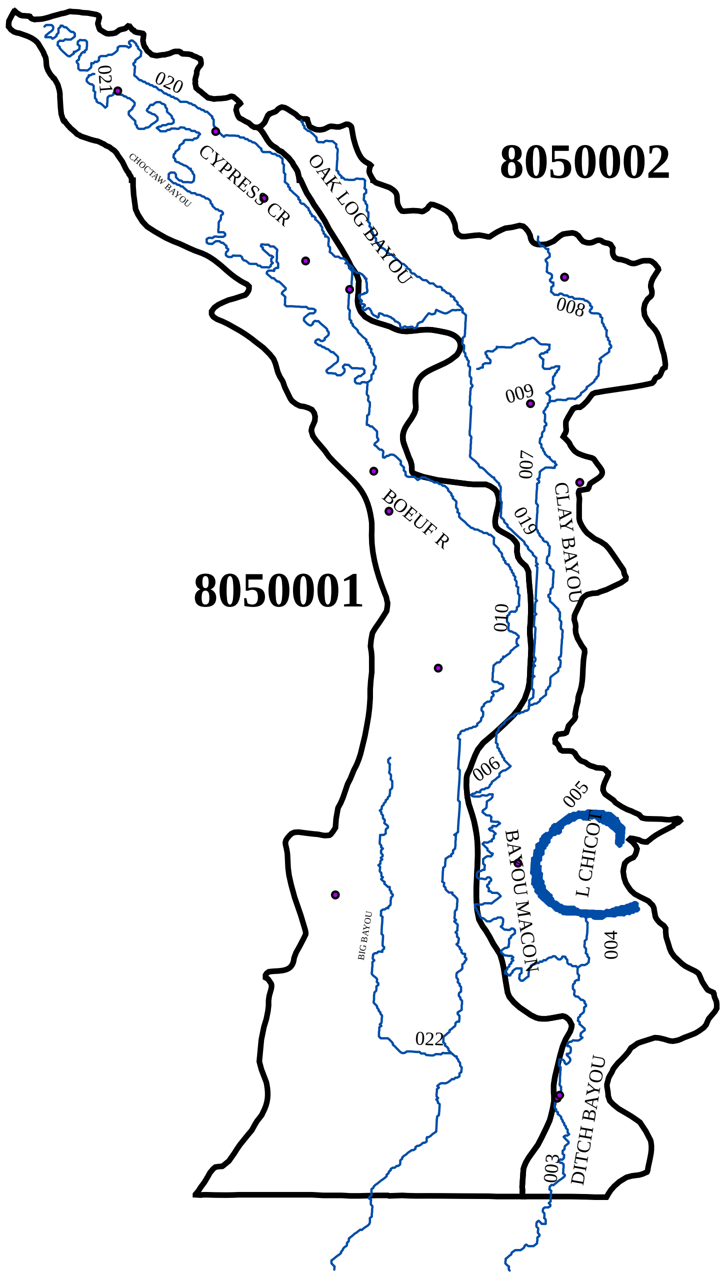


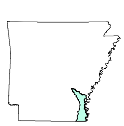
(Segment 2A)

Table A-31: Planning Segment 2A—Designated Use Attainment Status

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	OUA15A	M	S	N	S	S	S	S	AG	AG	AG	AG	SI	CL	TDS	SO4	5a	5a	5d	5d	FISH CONSUMPTION	427.2	0
Boeuf River	8050001	-019	58.1	BFR01	M	S	N	S	S	S	S	AG	AG	AG	AG	SI	CL	TDS	SO4	5a	5a	5d	5d	AQUATIC LIFE	163.7	302.1
Big Bayou	8050001	-022	27.1	BGB01,+	M	S	N	S	S	S	S	AG	AG	AG	AG	SI	CL	TDS	SO4	5a	5a	5d	5d	PRIMARY CONTACT	427.2	0
Cypress Creek	8050001	-020	47.5	OUA180	M	S	S	S	S	S	S									1				SECONDARY CONTACT	427.2	0
Choctaw Bayou	8050001	-021	58.9	OUA181	M	S	S	S	S	S	S									1				DRINKING SUPPLY	378.8	48.4
Macon Bayou	8050002	-003	80.5	BYM02	M	S	N	S	S	S	S	AG				SI				5a				AGRI & INDUSTRY	378.8	48.4
Ditch Bayou	8050002	-004	4	OUA172	M	S	S	S	S	S	S									1						
Macon Bayou	8050002	-006	38.6		E		N					AG				SI				5a						
Clay Ditch	8050002	-007	24.3	OUA173	M	S	S	S	S	S	S									1						
Boggy Creek	8050002	-009	12		E	S	S	S	S	S	S									1						
Oak Bayou	8050002	-010	48.4	OUA179	M	S	N	S	S	N	N	AG	AG			SI	CL	TDS		5a	5a	5a				
Red Fork Creek	8050002	-008	17	OUA177	M	S	S	S	S	S	S									1						
TOTAL MILES	465.8																									
MILES UNASSESSED	0																									
MILES EVALUATED	50.6																									
MILES MONITORED	415.2																									

Figure A-12: Planning Segment 2A – NPDES Permitted Facilities





(Segment 2A)

Table A-32: Segment 2A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0021610	Watson, City of	REB FORK BAYOU	8050002	2A
AR0021679	Gould, City of	TRIB, KERCH CAN, CYPRESS CR	8050001	2A
AR0021849	Lake Village, City of	LITTLE LAKE BAYOU, BAYOU MACON, BOEUF R	8050002	2A
AR0022071	McGehee, City of	BAYOU BARTHOLOMEW	8050001	2A
AR0022250	Dermott, City of – South Pond	BAYOU BARTHOLOMEW, OUACHITA R	8050001	2A
AR0033707	Tillar, City of	CAN #18, MACON BAYOU, BOEUFF R	8050001	2A
AR0033839	Eudora, City of	DITCH, BAYOU MACON	8050002	2A
AR0033987	Dumas, City of	CAN #19, BAYOU MACON	8050001	2A
AR0034371	Portland, City of	TRIB, BAYOU BARTHOLOMEW, OUACHITA R	8050001	2A
AR0037125	Mitchellville, City of	CAN #19, CYPRESS CR, AMOS BAYOU, BOGGY BAYOU	8050002	2A
AR0039039	Delta Special School District	DITCH, BOGGY BAYOU, CLAY BAYOU	8050002	2A
AR0039381	Grady, City of	CAN #19, BAYOU MACON	8050001	2A
AR0040827	AR Dept of Corrections – Cummins	CAN #19	8050002	2A
AR0041297	Montrose, City of	WARD BAYOU TRIB	8050001	
AR0042838	Farmland Ind, Inc – Southern	BAYOU MACON	8050001	2A
AR0046507	AR Hwy Dept – McGehee HQ	DITCH, CAN#18,MACON BAYOU, MACON L, CANEYBAYOU	8050001	2A

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	7.56	4.80	11.20	1.25
BOD_5 (mg/L)	55	3.51	1.25	7.38	1.43
pH (standard units)	57	7.45	6.84	8.18	0.34
Total Organic Carbon (mg/L)	51	8.41	2.73	31.58	4.23
Ammonia as N (mg/L)	55	0.14	<0.005	1.07	0.19
NO_2+NO_3 as N (mg/L)	56	0.44	<0.01	1.56	0.40
Orthophosphate as P (mg/L)	55	0.17	<0.005	0.89	0.15
Total phosphorus as P (mg/L)	53	0.37	0.048	1.89	0.30
Total hardness (mg/L)	26	138.73	24	490.00	130.01
Chloride (mg/L)	57	54.84	4.45	162.35	43.82
Sulfate (mg/L)	56	26.04	4.98	108.40	24.67
Total dissolved solids (mg/L)	42	319.19	83.5	804.00	157.00
Total suspended solids (mg/L)	42	123.12	8	1396.00	230.41
Turbidity (NTU)	54	157.02	5	1220.00	215.52

SEGMENT 2B BAYOU BARTHOLOMEW AND TRIBUTARIES

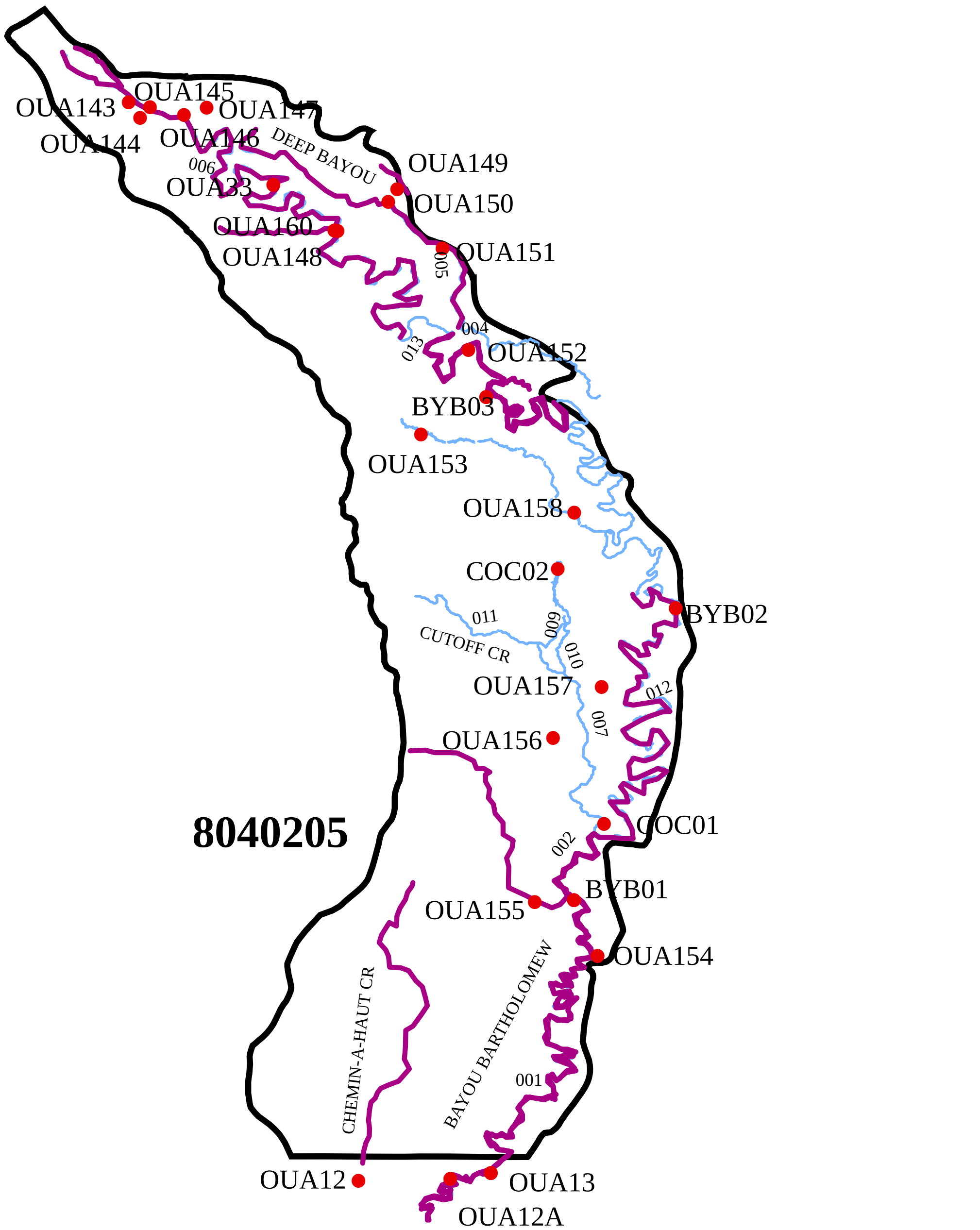
Segment 2B, located in the southeastern part of Arkansas, covers parts of Jefferson, Lincoln, Drew and Ashley Counties. The major streams in this segment are Bayou Bartholomew, Ables Creek, Cutoff Creek and their tributaries.

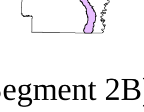
Summary of Water Quality Conditions

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 454.4 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 due to siltation and turbidity, this includes the tributary of Deep Bayou. 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% to 37% in order for the water quality in the bayou to be able to meet the in-stream water quality standard for turbidity.

Mercury contamination of fish tissue in 42.9 miles of Bayou Bartholomew and 16.8 miles of Cutoff Creek is limiting fish consumption in this basin. A TMDL for mercury was completed in September 2002 for this basin.

Figure A-13: Planning Segment 2B – Monitoring Stations





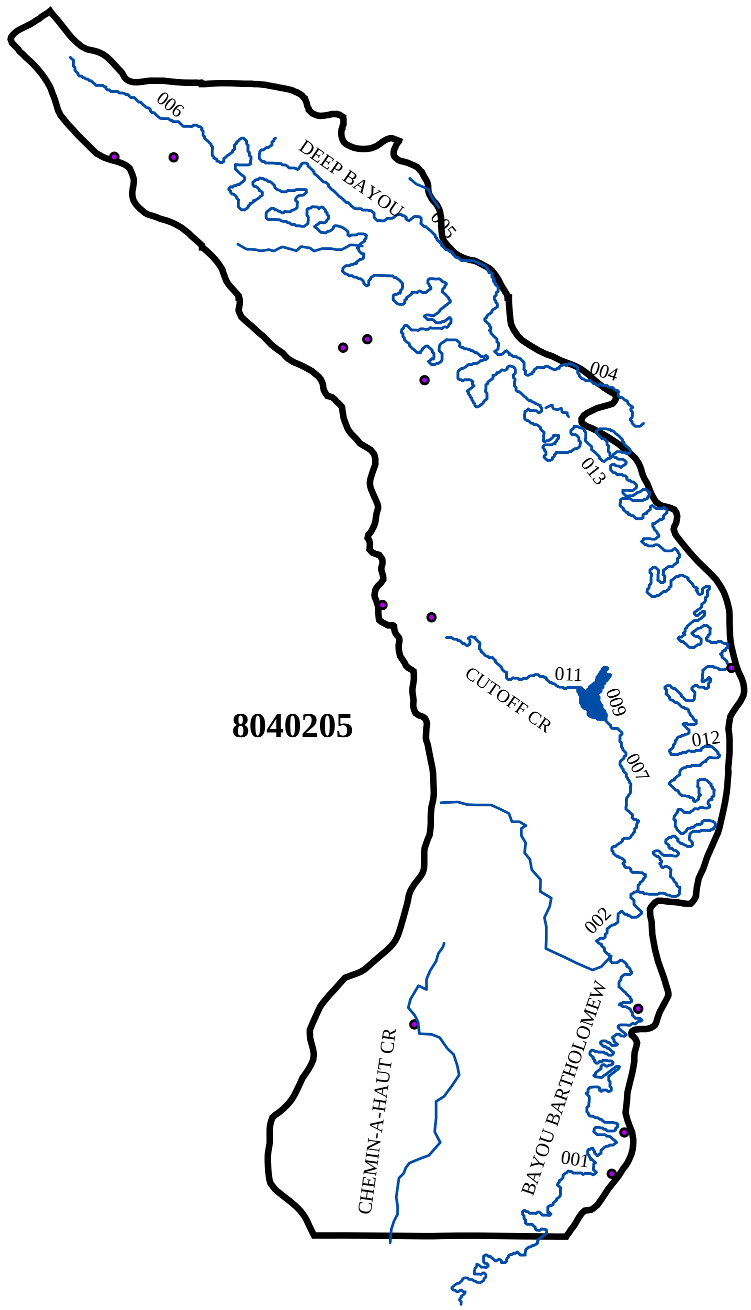
(Segment 2B)

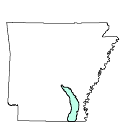
Table A-34: Planning Segment 2B—Designated Use Attainment Status

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-2B																							
B. Bartholomew	8040205	-001	60.1	OUA13	M	S	N	S	S	S	N	AG	UN			SI	CL			4a	5b		
B. Bartholomew	8040205	-002	17.9	OUA154	M	N	N	S	S	S	N	UN	AG	UN	AG	HG	SI	CL	DO	4a	4a	5b	5d
Bearhouse Creek	8040205	-901	24.4	OUA155	M	S	S	N	S	S	S	UN				PA				5d			
B. Bartholomew	8040205	-006	82.3	OUA33	M	S	N	S	S	S	S	AG	AG			SI	DO			4a	5d		
Harding Creek	8040205	-902	4.6	OUA145	M	S	S	S	N	S	S	UR				PA				5d			
Melton's Creek	8040205	-903	8.7	OUA160	M	S	N	S	S	S	S	UN				PA				5d			
Deep Bayou	8040205	-005	28.9	OUA151	M	S	N	S	S	S	S	AG	UN			SI	PA			4a	5d		
Jacks Bayou	8040205	-904	6	OUA150	M	S	S	N	S	S	S	UN				PA				5d			
Cross Bayou	8040205	-905	2.4	OUA152	M	S	S	N	S	S	S	UN				PA				5d			
B. Bartholomew	8040205	-012U	82.7	BYB02	M	S	N	S	S	S	N	AG	AG	AG	AG	SI	CL	TDS	DO	4a	5b	5b	5d
B. Bartholomew	8040205	-012	25	BYB02	M	N	N	S	S	S	S	UN	AG			HG	SI			4a	4a		
B. Bartholomew	8040205	-013	33.9	BYB03	M	S	N	S	S	S	N	AG	AG	AG	AG	SI	CL	TDS	PA	4a	5b	5b	5d
Nevins Creek	8040205	-906	8.5	OUA144	M	S	S	S	S	S	S									1			
Cutoff Creek	8040205	-007	16.8	COC01	M	N	N	S	S	S	S	UN	UN			HG	SI			4a	5d		
Cutoff Creek	8040205	-011	11.8	COC02	M	S	S	S	S	S	S									1			
Chemin-A-Haut Creek	8040205	-907	30.5	OUA12	M	S	S	N	S	S	S	UN				PA				5b			
Overflow Creek	8040205	-908	9.9	OUA12A	M	S	S	S	S	S	S												
TOTAL MILES	454.4																						
MILES UNASSESSED	0																						
MILES EVALUATED	0																						
MILES MONITORED	454.4																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	394.7	59.7
AQUATIC LIFE	98.1	356.3
PRIMARY CONTACT	391.1	63.3
SECONDARY CONTACT	449.8	4.6
DRINKING SUPPLY	454.4	0
AGRI & INDUSTRY	259.8	194.6

Figure A-14: Planning Segment 2B – NPDES Permitted Facilities





(Segment 2B)

Table A-35: Segment 2B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0021831	Monticello, City of – East Plant	GODFREY CR	8040205	2B
AR0022144	Wilmot, City of	BAYOU BARTHOLOMEW	8040205	2B
AR0034029	Hamburg, City of	CHEMIN-A-HAUT CR	8040205	2B
AR0037141	Parkdale, City of	BAYOU BARTHOLOMEW	8040205	2B
AR0037885	Boggy Bayou SID	BOGGY BAYOU, BAYOU BARTHOLOMEW	8040205	2B
AR0039144	Pinewood SID #1	TRIB, NEVINS CR	8040205	2B
AR0041602	Suburbia SID #1	NEVIN CR, BAYOU BARTHOLOMEW	8040205	2B
AR0045888	AR Parks & Tourism – Cane Creek	CANE CR	8040205	2B
AR0046477	Star City, City of	CANE CR, BAYOU BARTHOLOMEW, OUACHITA R	8040205	2B
AR0047350	Pine Haven Mobile Lodge	GODFREY CR TRIB, CUTOFF CR, BAYOU BARTHOLOMEW	8040205	2B
AR0047872	Robert Floyd Sawmill, Inc.	TRIB, CANE CR, BAYOU BARTHOLOMEW	8040205	2B

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	71	6.78	4.00	9.10	1.12
BOD_5 (mg/L)	69	1.37	0.60	3.05	0.46
pH (standard units)	71	7.12	6.33	7.88	0.36
Total Organic Carbon (mg/L)	66	9.53	4.51	23.81	3.52
Ammonia as N (mg/L)	70	0.05	<0.005	0.14	0.03
NO_2+NO_3 as N (mg/L)	70	0.24	<0.01	0.74	0.17
Orthophosphate as P (mg/L)	69	0.1	0.012	0.20	0.04
Total phosphorus as P (mg/L)	66	0.23	0.05	0.41	0.09
Total hardness (mg/L)	40	45.5	10	124.00	34.24
Chloride (mg/L)	72	13.29	1.73	42.30	11.62
Sulfate (mg/L)	71	6.77	3.1	30.70	4.53
Total dissolved solids (mg/L)	56	137.5	64	221.50	42.52
Total suspended solids (mg/L)	57	22.19	2.5	204.50	26.84
Turbidity (NTU)	70	47.67	7.2	122.00	26.51

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	67	6.12	0.20	13.70	2.64
BOD_5 (mg/L)	65	2.04	0.00	5.21	1.06
pH (standard units)	66	6.7	5.76	7.85	0.47
Total Organic Carbon (mg/L)	63	10.68	5.95	19.70	2.91
Ammonia as N (mg/L)	67	0.08	<0.005	1.30	0.17
NO_2+NO_3 as N (mg/L)	66	0.13	<0.01	1.51	0.21
Orthophosphate as P (mg/L)	67	0.11	0.018	0.33	0.08
Total phosphorus as P (mg/L)	63	0.22	0.057	0.41	0.09
Total hardness (mg/L)	39	42.77	12	130.00	33.76
Chloride (mg/L)	64	5.52	1.46	16.70	3.43
Sulfate (mg/L)	65	5.24	1.54	10.14	2.10
Total dissolved solids (mg/L)	54	105.25	58	205.50	36.88
Total suspended solids (mg/L)	53	12.65	2	39.30	8.45
Turbidity (NTU)	67	23.16	4.4	72.00	14.92

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	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	5.7	15.20	2.83
Ammonia as N (mg/L)	13	0.15	<0.005	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	0.073	0.27	0.06
Total phosphorus as P (mg/L)	12	0.29	0.128	0.45	0.12
Total hardness (mg/L)	13	114.31	26	262.00	73.64
Chloride (mg/L)	13	28.88	2.75	68.50	22.41
Sulfate (mg/L)	12	12.6	2.75	25.62	7.39
Total dissolved solids (mg/L)	13	261	146	414.00	83.51
Total suspended solids (mg/L)	13	56.08	<1.0	293.00	77.09
Turbidity (NTU)	13	99.96	3	260.00	94.58

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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.

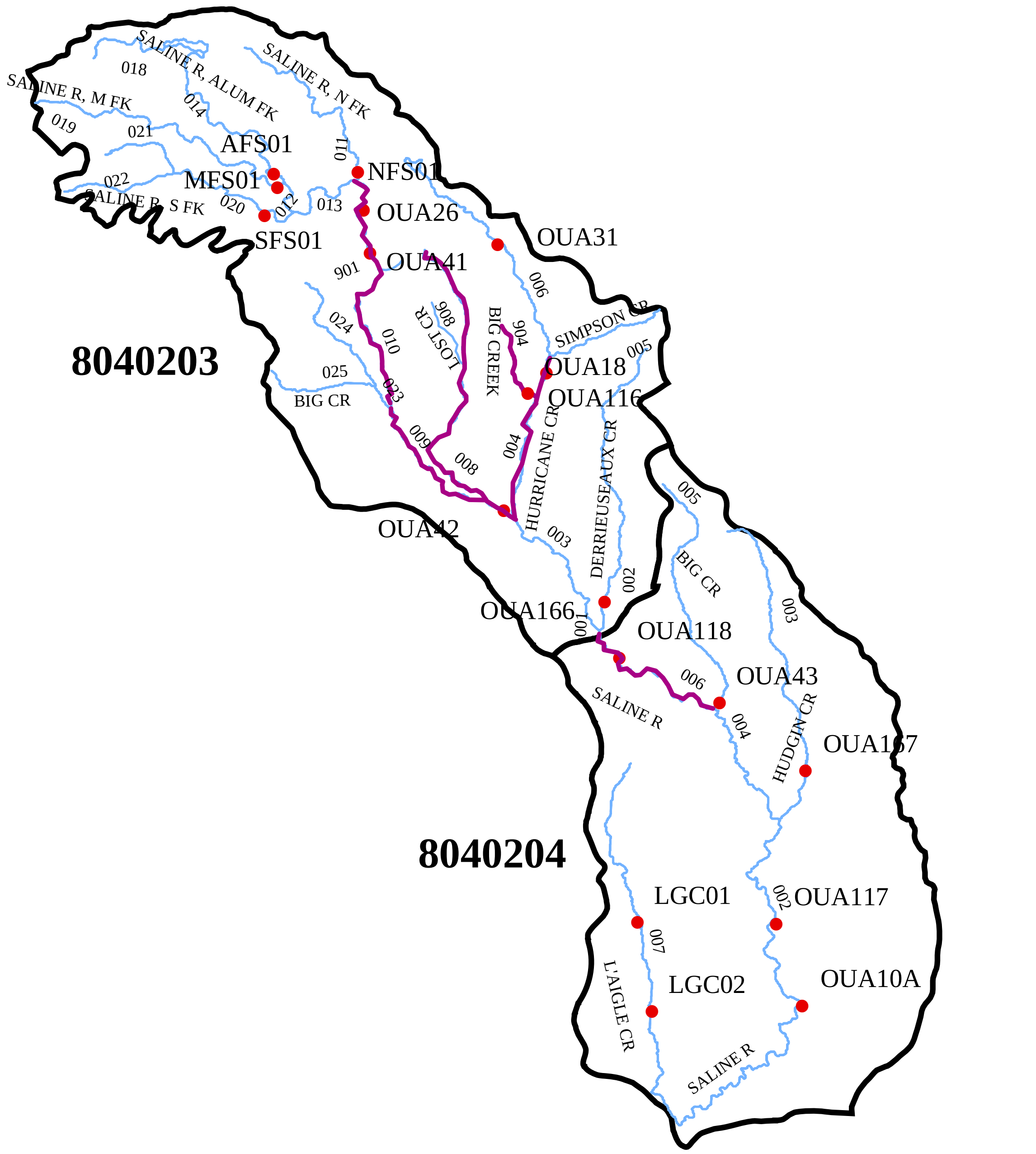
Summary of Water Quality Conditions

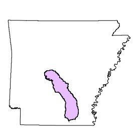
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, and public, industrial and agricultural water supplies. Slightly over one-half of the total stream miles within this segment are designated as extraordinary resource waters. This includes the Saline River and its primary headwater tributaries. Monitored data were used to assess 350.3 miles of stream and another 226 miles were evaluated. Total stream miles within the segment are 681.5 of which 556.3 were assessed within this process. The domestic water supply use has been removed from 83.8 miles in this segment due to excessive mineral content. Mineral content (chlorides, sulfates, 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 D.O. standard is 2 mg/L to prevent nuisance conditions. Many small seasonal streams in this ecoregion have D.O. levels below 2 mg/L during the critical season.

A fish consumption advisory has been placed on 89.9 miles of the lower Saline River because of mercury contamination. A TMDL was completed in September 2002 for these waters.

Figure A-15: Planning Segment 2C – Monitoring Stations



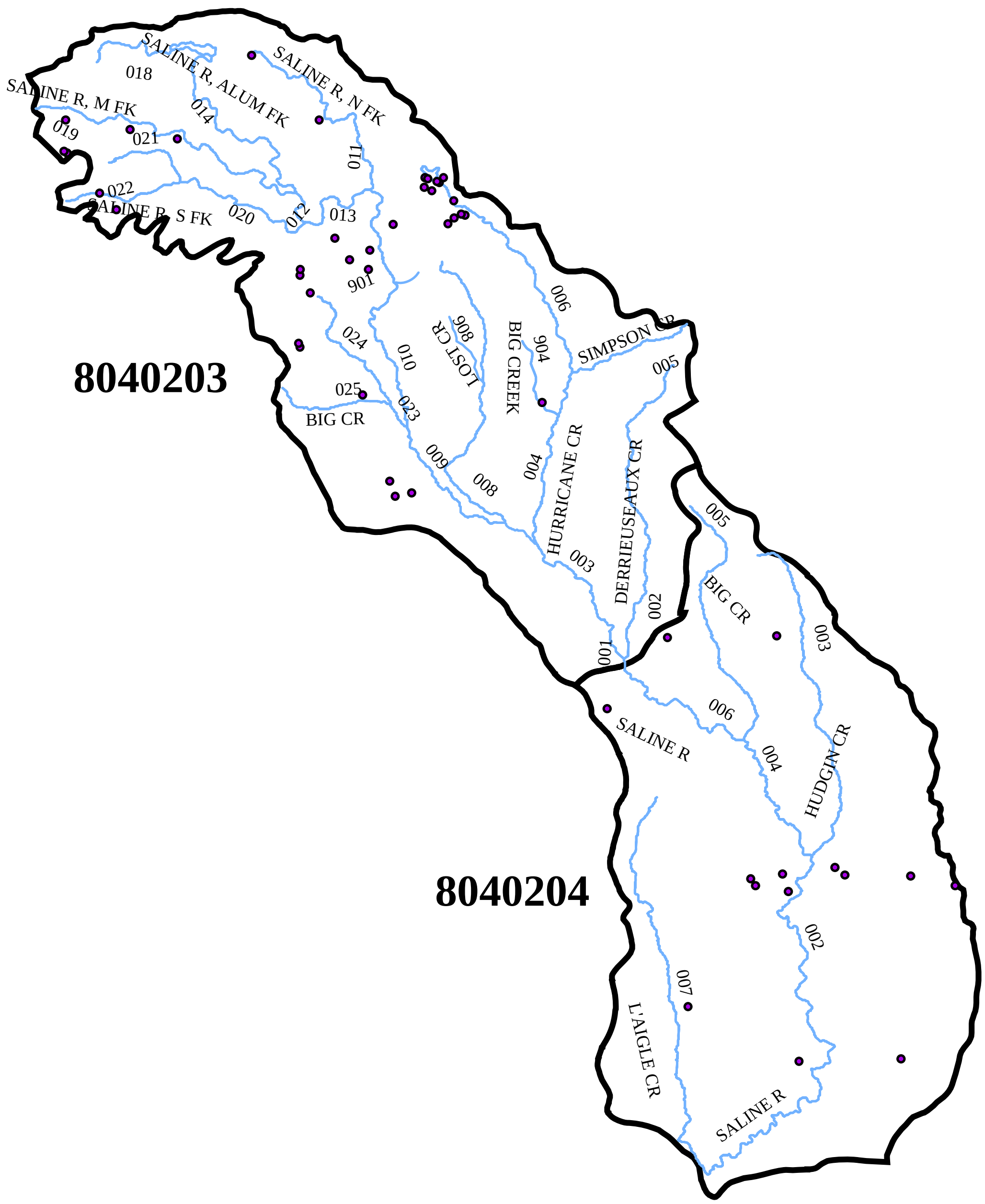


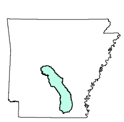
(Segment 2C)

Table A-39: Planning Segment 2C—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-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		E	S	S	S	S	S	S									1				AQUATIC LIFE	517.9	58.4
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	OUA116	M	S	N	S	S	R	S	UN				DO				5c				SECONDARY CONTACT	576.3	0
Simpson Creek	8040203	-005	12.3		E	S	S	S	S	S	S									1				DRINKING SUPPLY	492.5	0
Hurricane Cr.	8040203	-006	30.8	OUA31	M	S	S	S	S	R	S									1				AGRI & INDUSTRY	476.1	100.2
Saline River	8040203	-007	3.8	OUA42	M	S	S	S	S	S	N	RE				TDS				5b						
Lost Creek	8040203	-008	33.5		E	S	S	S	S	R	N	RE				TDS				5b						
Saline River	8040203	-009	15.6		E	S	S	S	S	S	N	RE				TDS				5b						
Saline River	8040203	-010	29.8	OUA26&41	M	S	S	S	S	S	N	RE	RE			TDS	SO4			5b	5b					
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		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		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		E	S	S	S	S	S	S									3						
Big Creek	8040203	-904	10	OUA18	M	S	N	S	S	S	S	MP	UN	MP		OE	SI	Pb		5a	5a	5c				
Saline River	8040204	-001	2.8		M	N	S	S	S	S	S	UN				HG				4a						
Saline River	8040204	-002	53	OUA10A,117	M	N	S	S	S	S	S	UN				HG				4a						
Saline River	8040204	-004	16.4		M	N	S	S	S	S	S	UN				HG				4a						
Saline River	8040204	-006	17.5	OUA118	M	N	S	S	S	S	N	UN	RE	RE		HG	TDS	SO4		4a	5b	5b				
Hudgins Creek	8040204	-003	36.7		E	S	S	S	S	S	S									1						
Big Creek	8040204	-005	28.9	OUA43	M	S	N	S	S	S	S	UN	UN			ph	SI			5c	5d					
L'Aigle Creek	8040204	-007	44.2	LGC01&02	M	S	S	S	S	S	S									1						
TOTAL MILES	576.3																									
MILES UNASSESSED	0																									
MILES EVALUATED	226																									
MILES MONITORED	350.3																									

Figure A-16: Planning Segment 2C – NPDES Permitted Facilities





(Segment 2C)

Table A-40: Segment 2C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000582	Alcoa Co. – Bauxite	Hurricane CR, Holly CR, Dry Lost CR	8040203	2C
AR0000876	Potlatch Corp – Bradley Unit	Trib, Saline R (1,2) & Brushy Fork (3)	8040204	2C
AR0000914	Potlatch Corp – Southern Unit	Franklin CR, Saline R, Ouachita R	8040204	2C
AR0001112	Reynolds Metals Co – Hurricane	Trib, Hurricane CR	8040203	2C
AR0001236	Borden Chemical, Inc	Big CR, Francis CR, Saline R	8040203	2C
AR0021695	Rison, City of	Trib, Harrison CR, Saline R	8040204	2C
AR0021822	Monticello, City of – West Plant	Ten Mile CR, Saline R, Ouachita R	8040204	2C
AR0034002	Bryant, City of	Trib, Hurricane CR, Saline R, Ouachita	8040203	2C
AR0034291	Hot Springs Village POA	Mill CR, Middle Fork, Alum Fork, Saline R	8040203	2C
AR0034347	Sheridan, City of – South WWTP	Big CR, Hurricane CR, Saline R	8040203	2C
AR0035955	Bryant Pub School – Salem Elem	Trib, Hurricane CR	8040203	2C
AR0036358	Wabash Alloys	Dodson CR Trib	8040203	2C
AR0036498	Benton, City of	Trib, Depot CR, Saline R	8040203	2C
AR0037559	Cedar Hill Investments, LLC	Hurricane CR Trib	8040203	2C
AR0038989	Hermitage, Town of	Big Town CR, L'Aigle CR, Saline R	8040204	2C
AR0039284	Hot Springs Village – Cedar CR	Cedar CR, South Fork, Saline R	8040203	2C
AR0040096	Wilmar, City of	Flat Branch CR, Ten Mile CR	8040204	2C
AR0041416	Timber Ridge NeuroRehab Center	Henderson CR, North Fork/Saline R	8040203	2C
AR0042129	A.C. Paxton – Collegeville Height		8040203	2C
AR0042277	Pawnee Village POA	Trace CR Trib, Saline R	8040203	2C
AR0042421	Fountain Hill, City of	Flat CR Trib, Saline R	8040204	2C
AR0042889	JJ'S Truck Stop, Inc	Brushy CR Trib, Francois CR, Saline R	8040203	2C
AR0043257	Farm Fresh Catfish Co	Trib, Saline R	8040203	2C
AR0043427	Warren, City of – Wtr & Swr Comm	Saline R	8040204	2C
AR0043672	Kingsland, City of	Panther CR, Saline R, Ouachita R	8040204	2C
AR0044075	Fountain Lake School Dist 18	Trib, South Fork, Saline R	8040203	2C
AR0044105	Willamette Industries – Malvern	Trib, Big CR, Saline R	8040203	2C
AR0044156	Alcoa Road MHP	Trib, Hurricane CR	8040203	2C
AR0044423	Jessieville Public School	Trib, Coleman CR, Saline R	8040203	2C
AR0044547	Haskell, City of	Trace CR, Saline R	8040203	2C
AR0044652	Hurricane Lake MHP	Hurricane CR, Saline R	8040203	2C
AR0045047	Village Square Shopping Ctr	Trib, Mill CR, Saline R	8040203	2C

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0046141	Mountain Valley Retreat Center	Trib, South Fork Saline R	8040203	2C
AR0046698	International Paper Co – Leola	Trib, Saline R	8040203	2C
AR0046817	Glen Rose School Dist	Trib, Ten Mile CR	8040203	2C
AR0047210	Salem SID #10	Trib, Hurricane CR, Saline R	8040203	2C
AR0047431	Pathway Campground – AR Church	Trib, Brushy CR, Saline R	8040203	2C
AR0047732	J.P. Price Lumber Co	Trib, Clear CR, Saline R	8040204	2C
AR0047767	Robbins Sykes Flooring	Trib, Saline R	8040204	2C
AR0047830	Johnsville Sand & Gravel Co	Hunt Br, Saline R	8040204	2C
AR0047902	H.G. Toler & Son Lumber Co, Inc	Trib, Saline R	8040203	2C
AR0048003	Alumina & Ceramics Lab – Malakof	DITCH, Saline R	8040203	2C
AR0048135	Bauxite School Dist 14 – Plant 1	Trib, Holly CR, Saline R	8040203	2C
AR0048194	N Garland Co Youth Ctr	Trib, Coleman CR, Middle Fork Saline R	8040203	2C
AR0048259	Bauxite School Dist 14 – Plant 2	Hurricane CR Trib, Saline R	8040203	2C
AR0048445	Poyen, City of – WWTP	Trib, Big CR, Francois CR, Saline R	8040203	2C
AR0048569	Woodlawn School District #6	Trib, Hudgin CR, Saline R	8040204	2C
AR0049018	Benton, City of – Hurricane Lake	Hurricane CR, Saline R	8040203	2C
AR0049522	Fred’s Store Commercial Park	Pond, Hurricane CR Trib, Saline R	8040203	2C

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	7.91	6.60	9.70	0.65
BOD_5 (mg/L)	57	1.69	0.33	5.77	1.06
pH (standard units)	59	6.95	6.24	7.81	0.33
Total Organic Carbon (mg/L)	53	7.89	3.012	17.90	3.73
Ammonia as N (mg/L)	57	0.02	<0.005	0.10	0.03
NO_2+NO_3 as N (mg/L)	58	0.11	<0.01	0.48	0.11
Orthophosphate as P (mg/L)	57	0.02	<0.005	0.12	0.02
Total phosphorus as P (mg/L)	55	0.07	0.01	0.21	0.04
Total hardness (mg/L)	26	30.38	13	49.00	9.39
Chloride (mg/L)	58	5.24	1.67	36.20	5.05
Sulfate (mg/L)	57	19.53	6.49	62.40	10.70
Total dissolved solids (mg/L)	44	90.61	57	121.00	15.84
Total suspended solids (mg/L)	44	9.48	1.5	36.50	7.05
Turbidity (NTU)	57	13.44	2.8	38.00	8.09

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	36	6.75	0.79	12.02	3.48
BOD_5 (mg/L)	36	4.34	0.44	14.68	3.11
pH (standard units)	36	6.51	5.85	7.05	0.27
Total Organic Carbon (mg/L)	35	9.63	3.57	16.36	3.15
Ammonia as N (mg/L)	37	0.49	<0.005	2.34	0.61
NO_2+NO_3 as N (mg/L)	37	0.23	0.023	0.77	0.15
Orthophosphate as P (mg/L)	37	0.25	0.035	1.66	0.32
Total phosphorus as P (mg/L)	35	0.47	0.07	1.70	0.42
Total hardness (mg/L)	18	29.09	13	77.70	18.96
Chloride (mg/L)	35	10.06	3.2	34.65	7.96
Sulfate (mg/L)	36	14.95	4.51	71.72	14.57
Total dissolved solids (mg/L)	28	121.11	58	318.00	65.32
Total suspended solids (mg/L)	27	21.87	3	44.70	12.50
Turbidity (NTU)	37	28.04	1.2	55.90	13.20

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	20.89	5.07	735.00	94.59
BOD_5 (mg/L)	55	0.69	0.10	3.81	0.50
pH (standard units)	58	7.09	6.74	7.76	0.21
Total Organic Carbon (mg/L)	54	3.29	1.55	10.90	1.81
Ammonia as N (mg/L)	59	0.01	<0.005	0.05	0.01
NO_2+NO_3 as N (mg/L)	60	0.11	<0.01	0.42	0.10
Orthophosphate as P (mg/L)	59	0.01	<0.005	0.10	0.01
Total phosphorus as P (mg/L)	55	0.04	0.01	0.37	0.06
Total hardness (mg/L)	30	52.57	30	67.00	9.83
Chloride (mg/L)	58	2.79	1.65	8.83	1.14
Sulfate (mg/L)	59	6.34	4.18	18.00	1.98
Total dissolved solids (mg/L)	47	72.72	51.5	93.50	11.24
Total suspended solids (mg/L)	46	5.89	<1.0	45.00	7.46
Turbidity (NTU)	58	10.79	1.1	164.00	23.35

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	52	8.59	5.15	13.40	2.07
BOD_5 (mg/L)	50	0.95	0.18	2.39	0.54
pH (standard units)	52	7.11	6.40	8.02	0.40
Total Organic Carbon (mg/L)	47	5.27	2.16	9.46	1.60
Ammonia as N (mg/L)	52	0.07	<0.005	0.32	0.09
NO_2+NO_3 as N (mg/L)	53	0.3	0.028	1.24	0.20
Orthophosphate as P (mg/L)	52	0.01	<0.005	0.09	0.01
Total phosphorus as P (mg/L)	47	0.06	0.01	0.30	0.06
Total hardness (mg/L)	26	116.42	43	537.00	112.14
Chloride (mg/L)	51	6.63	2.72	15.50	2.73
Sulfate (mg/L)	52	94.05	<0.04	510.00	89.30
Total dissolved solids (mg/L)	40	265.73	97	933.00	181.04
Total suspended solids (mg/L)	39	15.63	<1.0	94.40	22.20
Turbidity (NTU)	52	17.18	<1.0	94.00	20.62

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.36	5.03	13.10	2.09
BOD_5 (mg/L)	55	0.74	0.12	1.42	0.30
pH (standard units)	57	7.09	6.48	7.87	0.22
Total Organic Carbon (mg/L)	52	3.59	1.97	8.70	1.38
Ammonia as N (mg/L)	58	0.02	<0.005	0.07	0.02
NO_2+NO_3 as N (mg/L)	59	0.41	0.11	2.38	0.39
Orthophosphate as P (mg/L)	58	0.04	<0.005	0.20	0.04
Total phosphorus as P (mg/L)	54	0.08	0.01	0.43	0.07
Total hardness (mg/L)	30	50.67	31	65.00	9.01
Chloride (mg/L)	57	5.06	1.52	16.00	3.14
Sulfate (mg/L)	58	29.29	5.18	76.70	14.26
Total dissolved solids (mg/L)	46	114.3	60.5	203.00	29.96
Total suspended solids (mg/L)	45	9.47	2	54.70	10.55
Turbidity (NTU)	57	10.49	2.3	79.00	12.90

Table A-46: OUA0042 Saline River @ Hwy 167

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	8.26	5.17	12.60	2.15
BOD_5 (mg/L)	59	0.84	0.00	2.07	0.42
pH (standard units)	58	6.81	6.01	7.73	0.44
Total Organic Carbon (mg/L)	55	6.27	2.707	15.50	2.83
Ammonia as N (mg/L)	60	0.02	<0.005	0.11	0.02
NO_2+NO_3 as N (mg/L)	59	0.18	<0.01	2.01	0.28
Orthophosphate as P (mg/L)	60	0.08	<0.005	1.78	0.23
Total phosphorus as P (mg/L)	56	0.12	0.01	1.66	0.22
Total hardness (mg/L)	30	38.28	17	53.00	9.40
Chloride (mg/L)	56	4.95	1.33	40.50	5.16
Sulfate (mg/L)	58	20.39	4.26	58.60	10.94
Total dissolved solids (mg/L)	47	94.55	48.5	164.00	20.66
Total suspended solids (mg/L)	47	8.39	2	43.50	7.67
Turbidity (NTU)	60	11.84	4.3	43.00	7.85

Table A-47: OUA0043 Big Creek @ Hwy 35

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	37	8.09	4.20	12.75	2.53
BOD_5 (mg/L)	37	1.34	0.32	3.14	0.67
pH (standard units)	37	6.08	5.44	6.97	0.36
Total Organic Carbon (mg/L)	36	11.66	5.489	20.20	3.39
Ammonia as N (mg/L)	38	0.05	<0.005	0.89	0.14
NO_2+NO_3 as N (mg/L)	37	0.16	<0.01	0.86	0.19
Orthophosphate as P (mg/L)	38	0.07	<0.005	0.32	0.07
Total phosphorus as P (mg/L)	36	0.13	0.026	0.35	0.08
Total hardness (mg/L)	19	24.89	13	49.00	8.54
Chloride (mg/L)	36	4.48	1.4	8.03	1.61
Sulfate (mg/L)	37	20.04	4.43	41.30	9.96
Total dissolved solids (mg/L)	30	93.88	60.5	126.50	15.19
Total suspended solids (mg/L)	29	7.37	<1.0	30.00	6.95
Turbidity (NTU)	38	18.36	6	36.60	8.56

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	7.06	1.30	12.38	2.83
BOD_5 (mg/L)	58	1.16	0.00	5.04	0.69
pH (standard units)	57	6.62	5.21	8.21	0.48
Total Organic Carbon (mg/L)	54	7.84	2.95	16.00	2.65
Ammonia as N (mg/L)	59	0.04	<0.005	0.21	0.05
NO_2+NO_3 as N (mg/L)	58	0.18	<0.01	0.95	0.19
Orthophosphate as P (mg/L)	59	0.03	<0.005	0.13	0.03
Total phosphorus as P (mg/L)	55	0.07	0.01	0.32	0.05
Total hardness (mg/L)	29	73.03	20	194.00	44.93
Chloride (mg/L)	55	6.08	1.69	17.41	3.13
Sulfate (mg/L)	57	73.23	6.2	392.00	77.17
Total dissolved solids (mg/L)	47	213.18	59.5	611.50	125.77
Total suspended solids (mg/L)	47	4.96	<1.0	19.30	4.49
Turbidity (NTU)	59	9.64	1.1	27.00	6.67

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)	58	7.92	6.90	10.10	0.57
BOD_5 (mg/L)	57	1.6	0.25	6.53	1.21
pH (standard units)	59	6.94	6.27	7.51	0.26
Total Organic Carbon (mg/L)	53	8.18	3.226	16.63	3.70
Ammonia as N (mg/L)	57	0.03	<0.005	0.10	0.03
NO_2+NO_3 as N (mg/L)	58	0.11	<0.01	0.47	0.11
Orthophosphate as P (mg/L)	57	0.02	<0.005	0.05	0.01
Total phosphorus as P (mg/L)	55	0.07	0.01	0.16	0.03
Total hardness (mg/L)	27	29.93	12	45.00	8.95
Chloride (mg/L)	59	4.37	1.78	7.88	1.33
Sulfate (mg/L)	59	20.12	6.34	61.30	10.98
Total dissolved solids (mg/L)	44	90.39	58	121.00	16.10
Total suspended solids (mg/L)	44	8.28	1	24.50	5.27
Turbidity (NTU)	57	14.18	2.4	55.60	10.28

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)	58	8.3	4.10	13.90	2.13
BOD_5 (mg/L)	58	0.84	0.00	2.20	0.43
pH (standard units)	57	6.77	5.86	8.06	0.46
Total Organic Carbon (mg/L)	54	7.54	2.292	18.60	3.83
Ammonia as N (mg/L)	59	0.02	<0.005	0.10	0.02
NO_2+NO_3 as N (mg/L)	58	0.12	<0.01	0.75	0.13
Orthophosphate as P (mg/L)	59	0.06	<0.005	0.21	0.06
Total phosphorus as P (mg/L)	55	0.11	0.01	0.26	0.07
Total hardness (mg/L)	30	37.35	12	80.00	12.90
Chloride (mg/L)	56	4.17	1.17	7.94	1.44
Sulfate (mg/L)	58	23.09	4.95	83.00	14.15
Total dissolved solids (mg/L)	47	99.64	52.5	213.00	25.40
Total suspended solids (mg/L)	47	5.86	<1.0	19.80	4.24
Turbidity (NTU)	59	10.75	2.6	32.50	6.02

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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

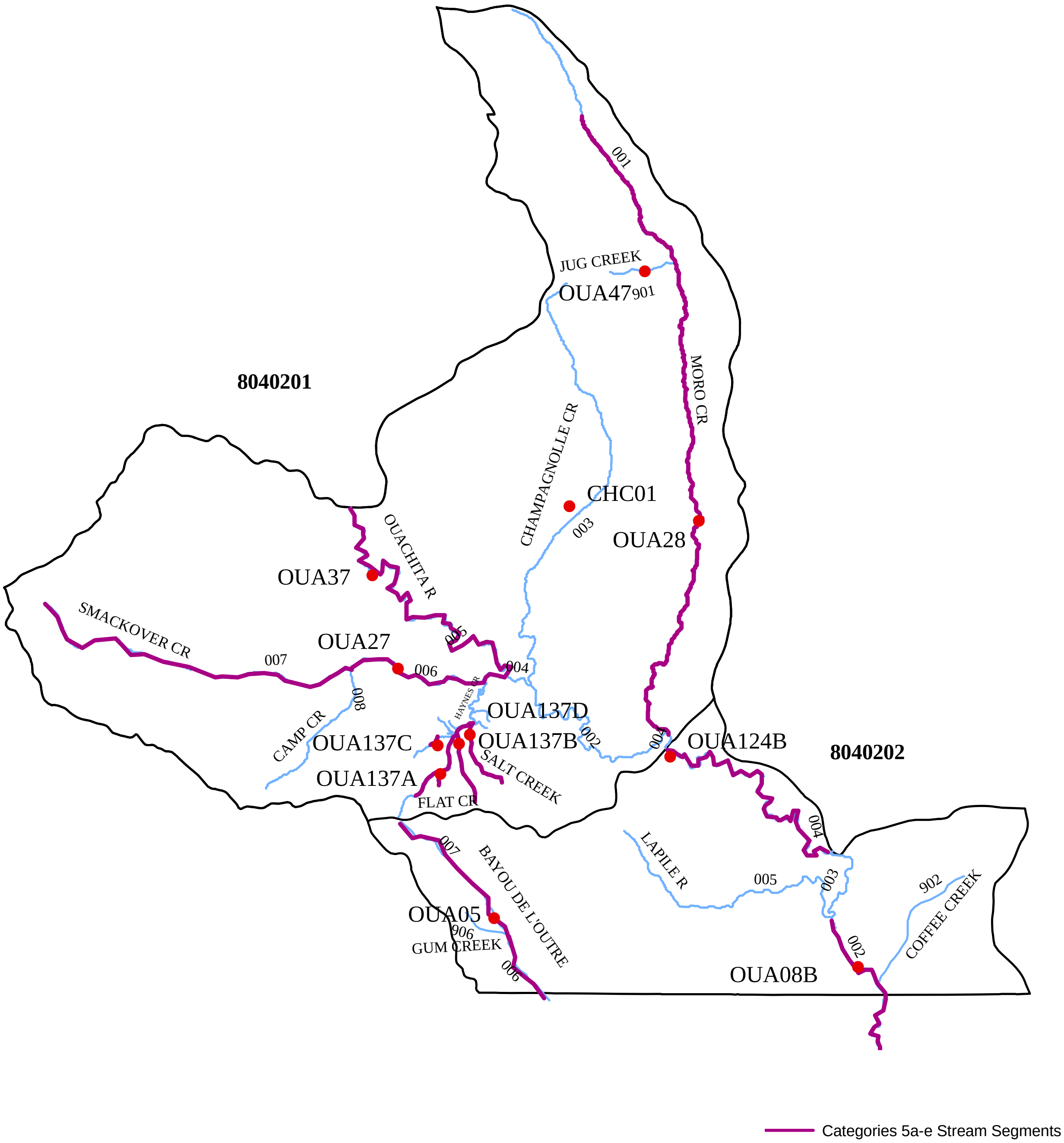
The waters within this segment have been designated as suitable for the propagation of fish/wildlife, primary and secondary contact recreation, and public, industrial, and agricultural water supplies. Monitored data were used as the basis of assessing 220.2 miles of stream. An additional 125.4 miles were evaluated bring the total number of miles assessed with in 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 due to 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. The source is unknown. Although still supporting its designated uses, Jug Creek below the City of Fordyce has elevated levels of nutrients and minerals.

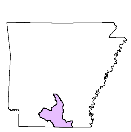
There has been significant improvement over the last five to ten years in the level of chlorides and total dissolved solids in Smackover Creek. With one exception, both chlorides and total dissolved solids have been well below the water quality standard for these constituents in Smackover Creek since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

The oil, brine and bromine extraction industry has contributed point and nonpoint source contamination to waters in this segment for many years. Recent water quality improvements are likely a result of clean up of the extraction sites; improved storage, such as phasing out open pits; and better maintenance of transmission lines, e.g., repair and replacement of broken and leaking pipelines.

Some of the most severe water quality problems exist in the unnamed tributary from El Dorado Chemical Company (ELCC), in Flat Creek and in Salt Creek. ELCC tributary contains toxic ammonia levels, very high nitrates and very high minerals (SO_4/ TDS); the source is from the El Dorado Chemical Company discharge. Flat Creek and Salt Creek have very high minerals (CL/ SO_4/TDS). 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 flows enter Smackover Creek below the ambient monitoring station on Smackover Creek. A TMDL addressing each of these water quality problems was completed in October 2002 and in October 2003.

Figure A-17: Planning Segment 2D – Monitoring Stations



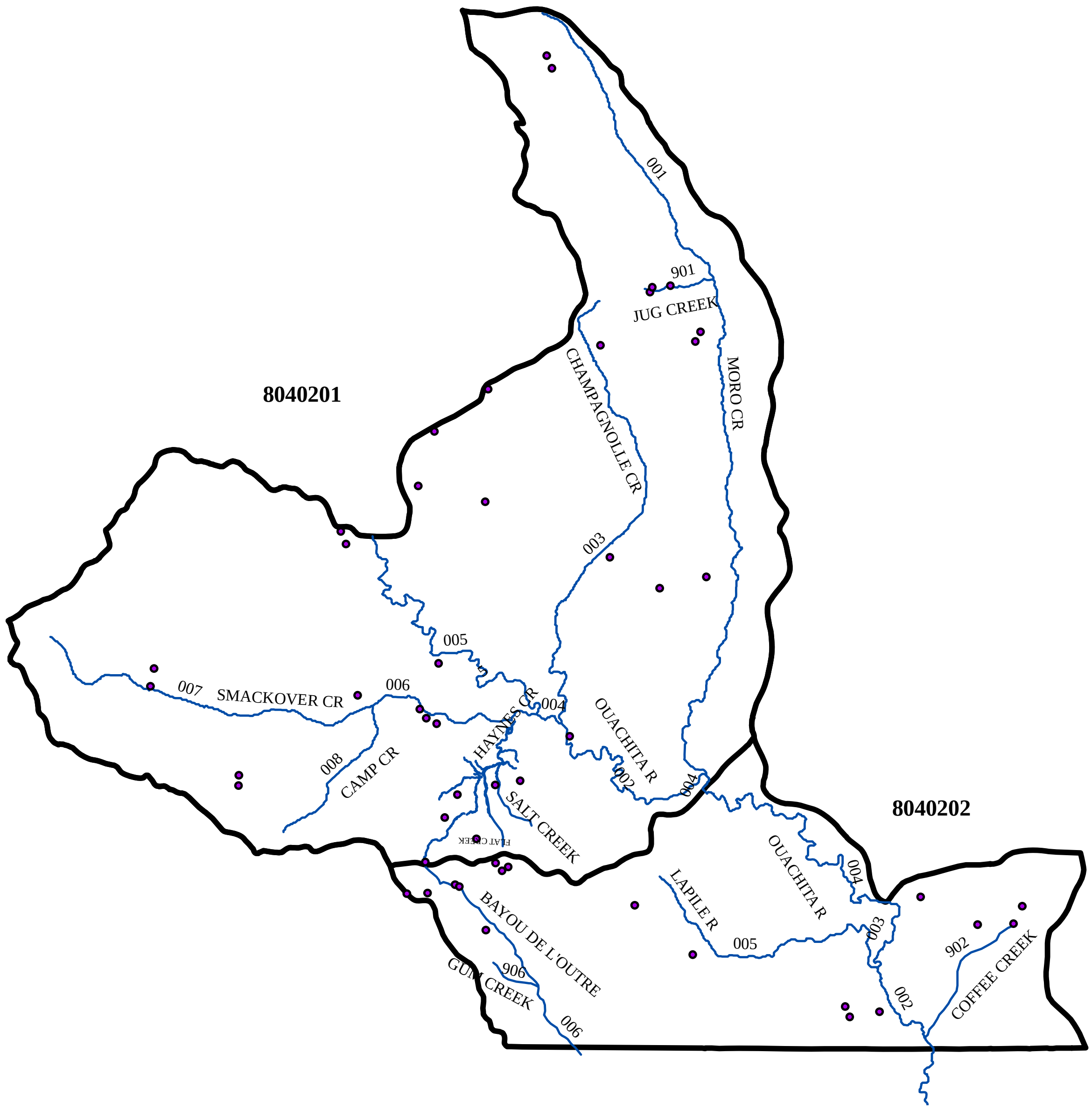


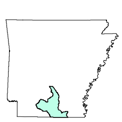
(Segment 2D)

Table A-51: Planning Segment 2D—Designated Use Attainment Status

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	OUA08B	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	OUA124B	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	OUA05	M	S	N	S	S	R	N	RE	RE	RE		TDS	SO4	*		5b	5b	5c		DRINKING SUPPLY	280.7	32.5
B. De L'Outre	8040202	-007	6.9		E	S	N	S	S	S	N	RE	RE	RE		TDS	SO4	*		5b	5b	5c		AGRI & INDUSTRY	295.7	49.9
B. De L'Outre	8040202	-008	10.6		E	S	N	S	S	S	N	RE	RE	RE		TDS	SO4	*		5b	5b	5c				
Moro Creek	8040201	-001U	57.9		E	S	N	S	S	S	S	UN				SI				5a						
Moro Creek	8040201	-001L	12	OUA28	M	N	N	S	S	S	S	UN	UN			HG	SI			4a	5a					
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	OUA37	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	CHC01	M	N	S	S	S	S	S	UN				HG				4a						
Smackover Cr.	8040201	-006	14.8	OUA27	M	S	N	S	S	S	S	RE				Zn				5d						
Smackover Cr.	8040201	-007	29.1		E	S	N	S	S	S	S	RE				Zn				5d						
Camp Creek	8040201	-008	13.3		U															3						
Elcc Trib.	8040201	-606	8.5	OUA137A+	M	S	N	S	S	N	S	IP	IP	IP	IP	AM	NO3	Cu	Zn	4a	5a	5a	5a			
Flat Cr.	8040201	-706	16	OUA137C	M	S	N	S	S	N	S	IP	IP	IP		MN	Cu	Zn		4a	5a	5a				
Salt Cr.	8040201	-806	8	OUA137D	M	S	N	S	S	N	S	IP	IP			MN	Cu			4a	5a					
Haynes Cr.	8040201	-906	10		U															3						
Jug Creek	8040201	-901	8	OUA47	M	S	S	S	S	S	S									1						
TOTAL MILES	394.2																									
MILES UNASSESSED	48.6																									
MILES EVALUATED	125.4																									
MILES MONITORED	220.2																									

Figure A-18: Planning Segment 2D – NPDES Permitted Facilities





(Segment 2D)

Table A-52: Segment 2D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000558	International Paper Co – Camden	Ouachita R (001) & W Two Bayou (002)	8040201	2D
AR0000574	Cooper Tire & Rubber Co	DITCH, Boggy CR, Bayou De Loutre	8040202	2D
AR0000591	Cross Oil refining & Marketing	Smackover CR (103) & Holmes CR (4)	8040201	2D
AR0000647	Lion Oil Co – El Dorado Refinery	Loutre CR, Bayou De Loutre, Ouachita R	8040202	2D
AR0000663	Berry Petroleum Co – Stephens	Trib, Smackover CR, Ouachita R	8040201	2D
AR0000680	Great Lakes Chemical Corp – South	Gum CR – 2D (1) & Walker CR – 2E (2,3)	8040201	2D
AR0000752	El Dorado Chemical Co, Inc	Trib, Flat CR, Haynes CR, Ouachita R	8040202	2D
AR0000841	Arkansas Electric Coop – McClellan	Ouachita R	8040201	2D
AR0001171	Great Lakes Chemical Corp – Central	Bayou De Loutre (1,2,4) & Little Cornie Bayou	8040202	2D
AR0001210	Georgia Pacific – Crossett	Coffee CR, Ouachita R	8040202	2D
AR0020168	Stephens, City of	Smackover CR, Ouachita R	8040201	2D
AR0021440	Smackover, City of	Smackover CR, Ouachita R	8040201	2D
AR0021474	Bearden, City of	East Two Bayou, Ouachita R	8040201	2D
AR0021687	Strong, City of	Lapile CR, Ouachita R	8040202	2D
AR0021873	Hampton, City of	Champagnolle CR	8040201	2D
AR0022268	Huttig, City of	Ouachita R	8040202	2D
AR0022365	Camden, City of	West Two Bayou (1) & Ouachita R (2)	8040201	2D
AR0033715	Carthage, City of	Trib, Moro CR	8040201	2D
AR0033723	El Dorado, City of – South WWTP	Bayou De Loutre	8040202	2D
AR0033758	Fordyce, City of	Jug CR, Moro CR, Ouachita R	8040201	2D
AR0033812	North Crossett Utilities	Trib, Brushy CR, Ouachita R	8040202	2D
AR0033936	El Dorado, City of – North WWTP	Mill CR, Haynes CR, Smackover CR, Ouachita	8040201	2D
AR0034363	Shumaker Public Service Corp	Two Bayou CR	8040201	2D
AR0035653	Norphlet, City of	Trib, Flat CR, Haynes CR, Smackover CR	8040201	2D
AR0035661	Thornton, City of	Turners CR, Champagnolle CR, Ouachita	8040201	2D
AR0036064	Georgia Pacific – Fordyce Plywood	Jug CR, Moro CR	8040201	2D
AR0036072	Georgia Pacific – El Dorado Sawmill	Trib, Bayou De Loutre	8040202	2D

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0037761	Liberty Baptist Assn – DBA Beech	Trib, Ouachita R	8040201	2D
AR0037800	Teris, LLC	Boggy CR	8040202	2D
AR0038211	Calion, City of	Chappelle Slough, Ouachita R & Rb	8040201	2D
AR0039659	Felsenthal, Town of	Wolf Slough	8040202	2D
AR0040517	Louann, City of	Brushy CR, Smackover CR, Ouachita R	8040201	2D
AR0042315	Crossett Harbor Port Authority	Ouachita R	8040202	2D
AR0042609	Harrell, City of	Spring Br, Blann CR, Lloyd CR, Moro CR	8040201	2D
AR0044431	Jordan Town MHP	Trib, Bell Branch	8040202	2D
AR0044733	Wildwood Trailer Park	Trib, Flat CR, Haynes CR, Smackover CR	8040201	2D
AR0045233	Lockheed Martin Missiles & Fir	Trib, Locust Bayou, Ouachita R	8040201	2D
AR0045659	Welsco, Inc	DITCH, Holmes CR	8040201	2D
AR0046116	West Fraser (South), Inc	Dollar Slough(1, 2), Buckhorn Slough (4)	8040202	2D
AR0046451	Anthony Timberlands Inc – Fordyce	DITCH, Jug CR	8040201	2D
AR0047368	Columbian Chemicals Co	Trib, Boggy CR	8040201	2D
AR0047384	Anthony Forest Products Co	Cattail Marsh, North Lapile CR	8040202	2D
AR0047503	Idaho Timber Corp of Carthage	Trib, Moro CR, Ouachita R	8040201	2D
AR0048046	Rogers Lumber Co of Camden, Inc	Trib, Ouachita R	8040201	2D
AR0048097	Georgia Pacific – North Log Yard	Trib, Little Brushy CR, Big Brushy CR	8040202	2D
AR0048381	Watson Sawmill & Ltm Chips, Inc	Trib, Beech CR, Smackover CR, Ouachita R	8040201	2D
AR0049123	Mt Holly School Wastewater Sys	Trib, Dry CR, Beech CR, Smackover CR	8040201	2D
AR0049140	Union Power Partners, LP – Union	Ouachita R	8040202	2D
AR0049204	Georgia Pacific – Fordyce OSB FA	Trib, Moro CR, Ouachita R	8040201	2D
AR0049387	Hanson Aggregates – Eagle Mills	Mizzel CR, Ouachita R	8040201	2D
AR0049492	Meridian Aggregates Co – Harrell	Trib, Dunn CR, Ouachita R	8040201	2D

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	6.09	3.20	10.10	1.34
BOD_5 (mg/L)	56	1.72	0.20	7.49	1.09
pH (standard units)	59	6.82	5.91	7.81	0.40
Total Organic Carbon (mg/L)	52	13.82	4.6	34.77	5.39
Ammonia as N (mg/L)	56	0.18	<0.005	2.00	0.33
NO_2+NO_3 as N (mg/L)	57	1.24	0.049	10.66	1.83
Orthophosphate as P (mg/L)	56	0.08	0.01	0.49	0.09
Total phosphorus as P (mg/L)	52	0.17	0.026	0.69	0.13
Total hardness (mg/L)	27	50.11	19	94.00	16.27
Chloride (mg/L)	57	119.76	8.06	235.00	55.03
Sulfate (mg/L)	57	106.48	3.46	420.12	88.72
Total dissolved solids (mg/L)	43	484.44	79	1161.00	239.92
Total suspended solids (mg/L)	43	7.2	<1.0	28.00	5.60
Turbidity (NTU)	56	11.88	3.4	35.00	7.93

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	7.87	6.20	9.80	0.67
BOD_5 (mg/L)	55	1.31	0.13	3.01	0.56
pH (standard units)	57	6.92	6.23	7.74	0.30
Total Organic Carbon (mg/L)	51	7.43	3.07	15.90	3.66
Ammonia as N (mg/L)	55	0.04	<0.005	0.11	0.03
NO_2+NO_3 as N (mg/L)	56	0.15	<0.01	0.52	0.11
Orthophosphate as P (mg/L)	55	0.01	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	51	0.06	0.01	0.23	0.04
Total hardness (mg/L)	26	34.27	13	262.00	50.89
Chloride (mg/L)	57	12.11	3.26	57.70	8.90
Sulfate (mg/L)	56	10.41	4.57	115.00	14.57
Total dissolved solids (mg/L)	42	74.69	50	102.50	12.77
Total suspended solids (mg/L)	42	9.82	1	46.00	8.27
Turbidity (NTU)	55	14.75	1.5	63.60	10.88

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	6.54	2.30	11.50	1.62
BOD_5 (mg/L)	56	1.31	0.16	4.07	0.73
pH (standard units)	58	6.56	5.69	7.17	0.28
Total Organic Carbon (mg/L)	52	9.86	3.41	24.67	3.74
Ammonia as N (mg/L)	56	0.04	<0.005	0.17	0.04
NO_2+NO_3 as N (mg/L)	57	0.11	<0.01	0.73	0.14
Orthophosphate as P (mg/L)	56	0.03	<0.005	0.43	0.06
Total phosphorus as P (mg/L)	53	0.08	0.01	0.53	0.07
Total hardness (mg/L)	26	36.04	13	97.00	17.24
Chloride (mg/L)	58	64.95	5.6	164.00	38.54
Sulfate (mg/L)	57	10.36	2.45	135.00	22.93
Total dissolved solids (mg/L)	44	194.93	71	561.00	96.52
Total suspended solids (mg/L)	43	9.98	2.5	21.75	4.72
Turbidity (NTU)	56	15.93	3.9	35.90	7.33

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	46	7.19	5.20	9.00	0.91
BOD_5 (mg/L)	45	1.42	0.56	3.46	0.55
pH (standard units)	47	6.6	6.11	7.36	0.30
Total Organic Carbon (mg/L)	41	12.84	6.548	19.82	2.93
Ammonia as N (mg/L)	46	0.04	<0.005	0.12	0.03
NO_2+NO_3 as N (mg/L)	47	0.09	<0.01	0.53	0.10
Orthophosphate as P (mg/L)	46	0.02	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	45	0.08	0.01	0.38	0.07
Total hardness (mg/L)	22	12	8	22.00	3.74
Chloride (mg/L)	47	4.34	1.72	7.99	1.51
Sulfate (mg/L)	46	4.86	1.55	18.00	2.71
Total dissolved solids (mg/L)	35	73.64	48	95.00	11.36
Total suspended solids (mg/L)	35	7.68	1	25.30	5.54
Turbidity (NTU)	46	18.2	7.5	46.50	8.49

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	7.91	6.50	10.10	0.74
BOD_5 (mg/L)	53	1.06	0.21	6.30	0.95
pH (standard units)	56	6.98	6.44	7.52	0.26
Total Organic Carbon (mg/L)	50	5.66	1.53	13.49	2.53
Ammonia as N (mg/L)	54	0.03	<0.005	0.12	0.03
NO_2+NO_3 as N (mg/L)	55	0.17	<0.01	0.40	0.09
Orthophosphate as P (mg/L)	54	0.02	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	51	0.06	0.01	0.16	0.03
Total hardness (mg/L)	26	21.38	15	27.00	3.16
Chloride (mg/L)	56	6.64	2.3	88.40	12.07
Sulfate (mg/L)	55	9.03	5.26	24.51	3.66
Total dissolved solids (mg/L)	44	66.91	44	208.00	27.27
Total suspended solids (mg/L)	43	13.34	4	41.50	7.97
Turbidity (NTU)	54	14.69	5.2	35.00	7.25

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	7.16	2.90	11.27	2.43
BOD_5 (mg/L)	58	2.13	0.14	7.92	1.64
pH (standard units)	57	6.93	6.14	7.70	0.33
Total Organic Carbon (mg/L)	54	11.26	6.45	19.50	2.49
Ammonia as N (mg/L)	58	0.96	0.035	8.94	1.76
NO_2+NO_3 as N (mg/L)	57	2.19	0.067	13.50	2.42
Orthophosphate as P (mg/L)	58	0.65	0.088	1.65	0.43
Total phosphorus as P (mg/L)	54	0.75	0.146	1.77	0.42
Total hardness (mg/L)	30	60.4	33	80.00	13.48
Chloride (mg/L)	56	44.9	11.53	294.50	37.22
Sulfate (mg/L)	58	17.31	8.72	31.85	5.34
Total dissolved solids (mg/L)	47	255.81	140	691.00	84.07
Total suspended solids (mg/L)	47	6.69	1.5	21.50	4.72
Turbidity (NTU)	59	14.45	3.2	72.00	11.59

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	7.8	6.80	10.10	0.63
BOD_5 (mg/L)	52	1.14	0.12	2.81	0.57
pH (standard units)	54	6.9	6.27	7.32	0.22
Total Organic Carbon (mg/L)	48	6.75	1.261	14.53	3.45
Ammonia as N (mg/L)	52	0.06	<0.005	0.23	0.05
NO_2+NO_3 as N (mg/L)	53	0.24	<0.01	1.45	0.22
Orthophosphate as P (mg/L)	52	0.01	<0.005	0.07	0.01
Total phosphorus as P (mg/L)	51	0.06	0.01	0.16	0.03
Total hardness (mg/L)	23	22.13	13	35.00	5.16
Chloride (mg/L)	54	14.26	2.88	48.10	10.32
Sulfate (mg/L)	53	8.01	4.19	16.60	2.68
Total dissolved solids (mg/L)	42	77.21	51	140.50	20.03
Total suspended solids (mg/L)	41	11.13	1.5	33.00	6.26
Turbidity (NTU)	52	15.45	6.1	47.00	8.74

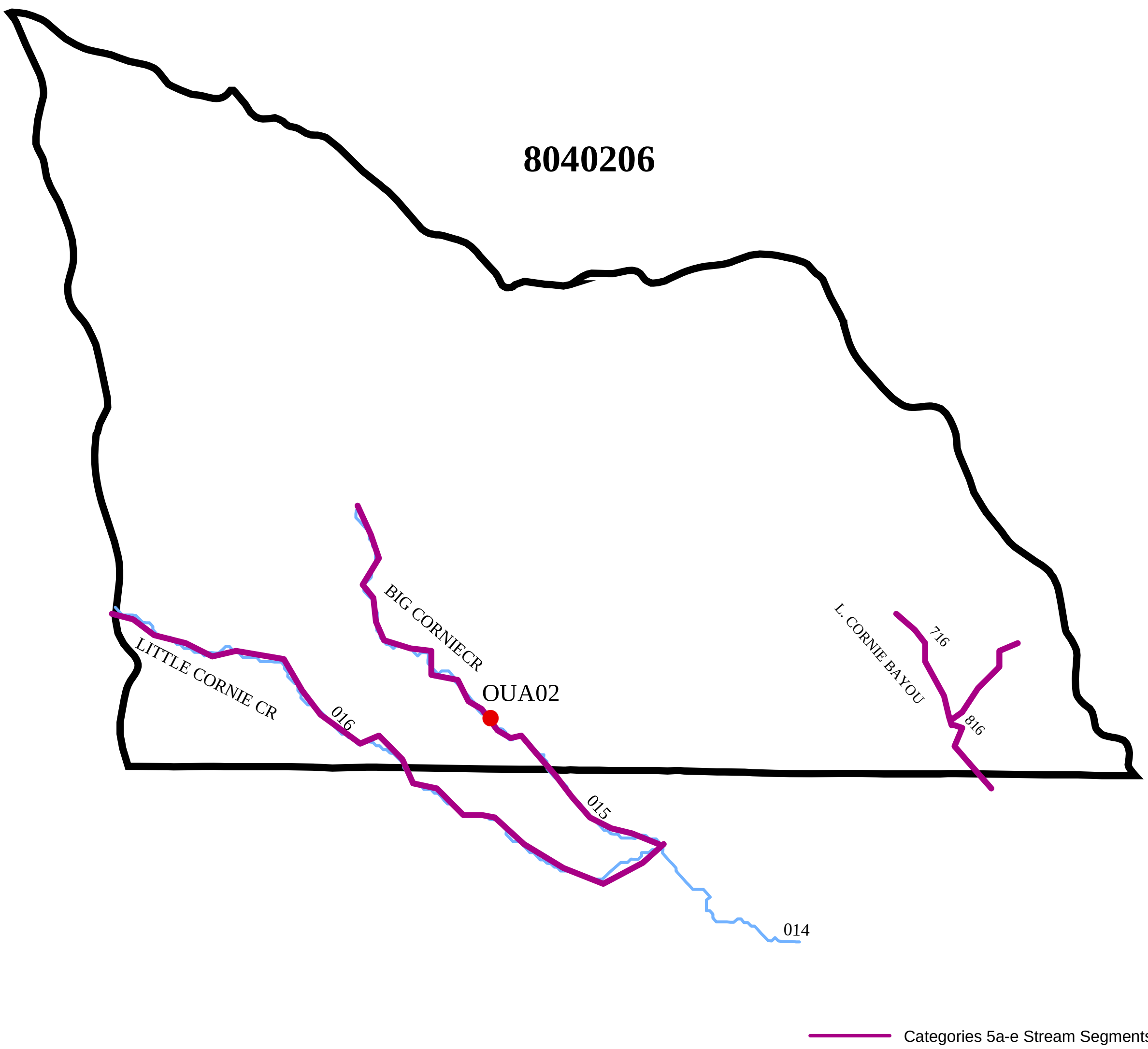
SEGMENT 2E UPPER CORNIE BAYOU AND TRIBUTARIES

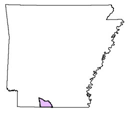
Segment 2E is located in south central Arkansas and covers parts of Columbia and Union Counties. This segment includes the upper portions of Cornie Bayou and Little Cornie Bayou, which eventually flow into the Ouachita River in northern Louisiana. The two major tributaries are Beech Creek and Three Creeks.

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 93.0 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.

Figure A-19: Planning Segment 2E – Monitoring Stations





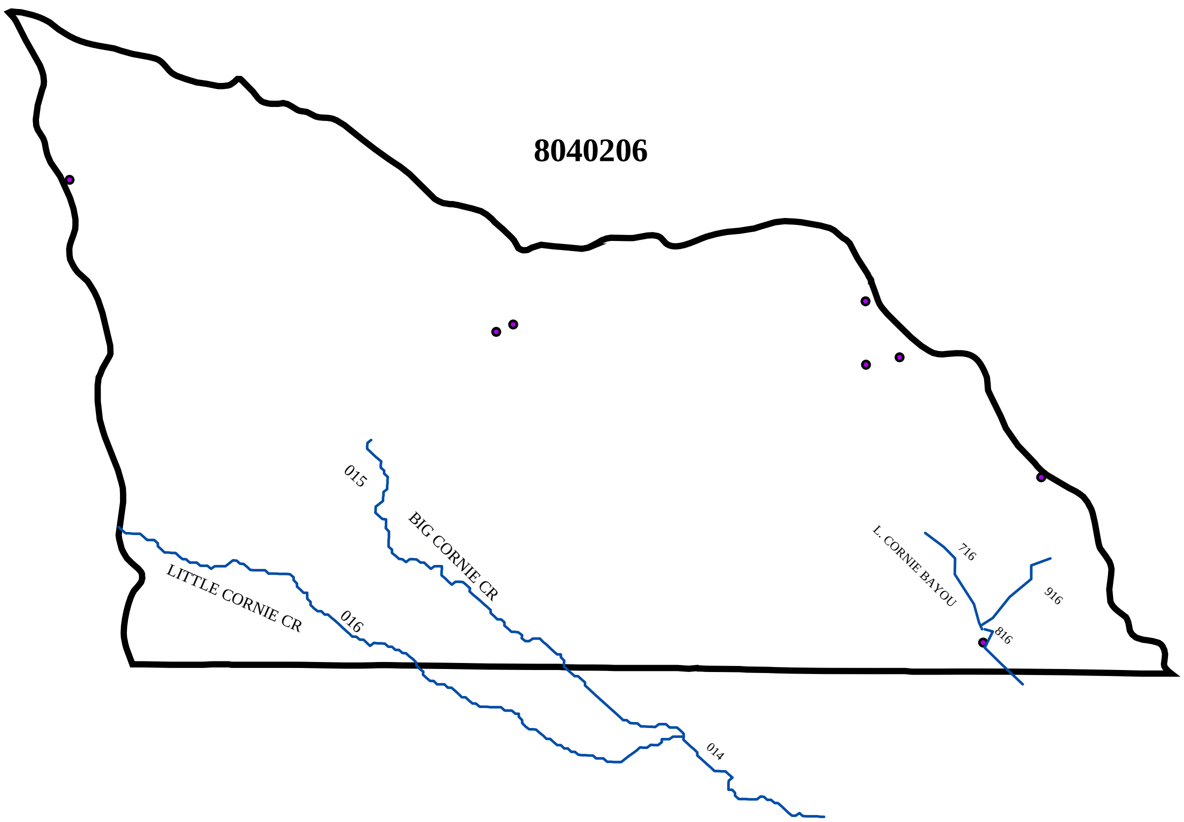
(Segment 2E)

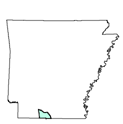
Table A-60: Planning Segment 2E—Designated Use Attainment Status

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-2E																										
Big Cornie Cr.	8040206	-015	15	OUA02	M	S	N	S	S	S	N	RE	RE			SO4	Zn			5b	5a			FISH CONSUMPTION	44	0
Little Cornie Cr.	8040206	-016	18		E	S	N	S	S	S	N	RE	RE			SO4	Zn			5b	5c			AQUATIC LIFE	0	44
Little Cornie Bayou	8040206	-716	5		E	S	N	S	S	S	N	RE	RE			SO4	Zn			5b	5c			PRIMARY CONTACT	44	0
Little Cornie Bayou	8040206	-816	3		E	S	N	S	S	R	N	RE	RE			SO4	Zn			5b	5c			SECONDARY CONTACT	44	0
Walker Branch	8040206	-916	3		E	S	N	S	S	R	N	RE	RE			SO4	Zn			5b	5c			DRINKING SUPPLY	38	0
																								AGRI & INDUSTRY	0	44

TOTAL MILES	44
MILES UNASSESSED	0
MILES EVALUATED	29
MILES MONITORED	15

Figure A-20: Planning Segment 2E – NPDES Permitted Facilities





(Segment 2E)

Table A-61: Segment 2E Active NPDES Permits

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

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	6.49	3.70	10.30	1.48
BOD_5 (mg/L)	52	1.46	0.49	5.96	0.82
pH (standard units)	54	6.57	5.77	7.33	0.33
Total Organic Carbon (mg/L)	48	11.36	4.996	24.66	3.48
Ammonia as N (mg/L)	52	0.05	<0.005	0.55	0.10
NO_2+NO_3 as N (mg/L)	53	0.36	<0.01	3.00	0.73
Orthophosphate as P (mg/L)	52	0.02	<0.005	0.17	0.02
Total phosphorus as P (mg/L)	50	0.08	0.01	0.45	0.06
Total hardness (mg/L)	25	34.6	19	67.00	12.69
Chloride (mg/L)	53	66.79	13.1	270.00	58.72
Sulfate (mg/L)	52	28.5	1.5	261.60	53.26
Total dissolved solids (mg/L)	41	234.76	97.5	767.50	173.44
Total suspended solids (mg/L)	40	9.17	1	46.30	7.65
Turbidity (NTU)	52	12.65	2.5	30.00	6.22

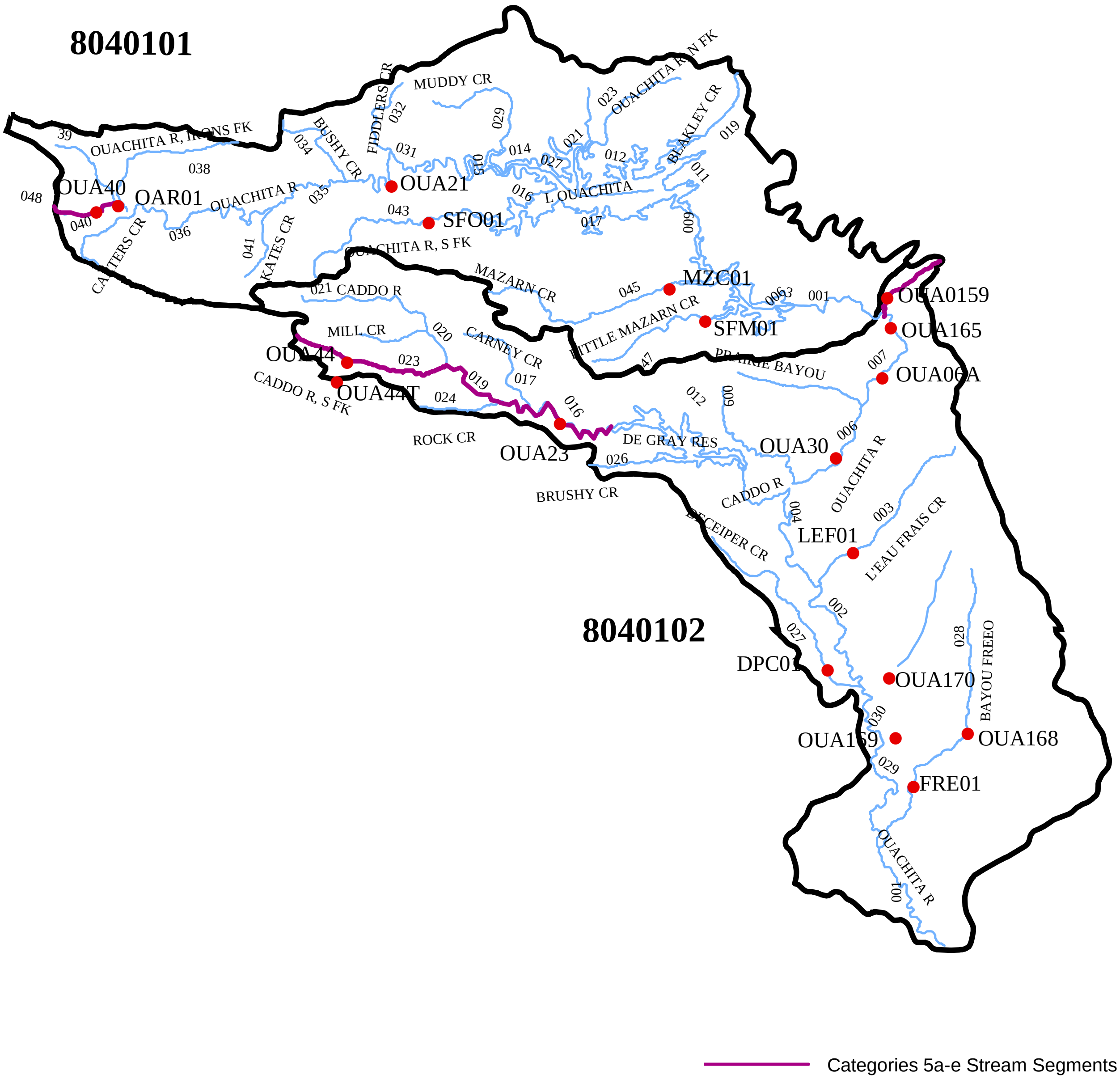
SEGMENT 2F — OUACHITA RIVER AND TRIBUTARIES: HEADWATERS TO CONFLUENCE WITH LITTLE MISSOURI RIVER

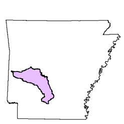
Segment 2F, located in west central Arkansas, covers most of Hot Spring, Garland and Montgomery Counties, portions of Clark, Dallas, Pike, Polk, Yell, and Ouachita Counties. This segment consists of a 220-mile reach of the upper Ouachita River and a 70-mile reach of the Caddo River. Principal tributaries 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 318.7 miles of stream within this segment. An additional 240.7 miles were evaluated bring the total number of miles assessed with in this segment to 559.4 stream miles. Approximately 36 percent of the waters within this segment are designated as extraordinary resource waters. Water quality in Basin 2F is generally good and trends seem to indicate it is improving. Major rivers in the basin, such as the Caddo, South Fork of the Caddo, and the Ouachita above the lake are all improving or holding steady. All waters assessed in this segment were meeting all designated uses. However, in Prairie Creek below the City of Mena sewage treatment plant, elevated nutrients were seen.

Figure A-21: Planning Segment 2F – Monitoring Stations





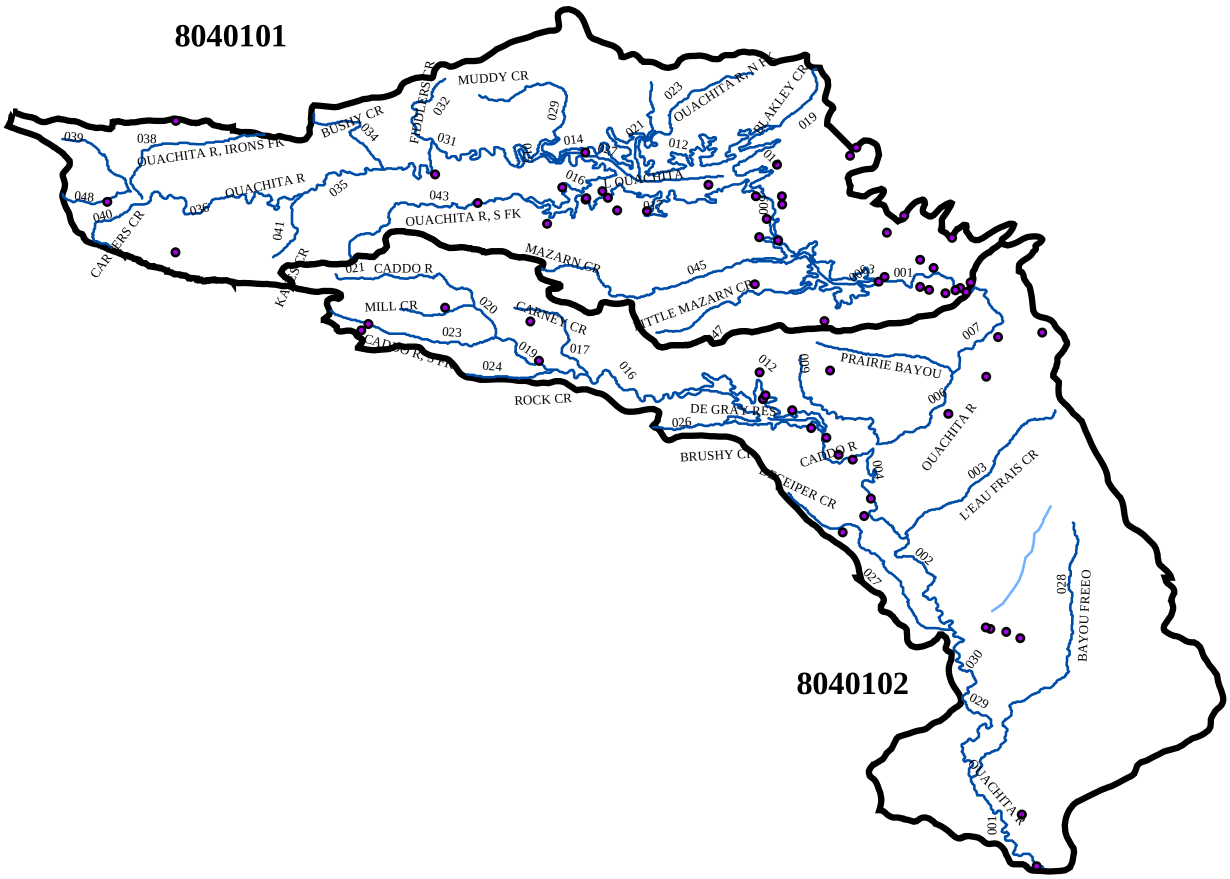
(Segment 2F)

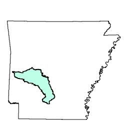
Table A-63: Planning Segment 2F—Designated Use Attainment Status

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-2F																										
Ouachita River	8040102	-001	15.6		E	S	S	S	S	S	S									1				FISH CONSUMPTION	559.4	0
Ouachita River	8040102	-002	16.9		E	S	S	S	S	S	S									1				AQUATIC LIFE	497.9	61.5
L'Eau Frais C.	8040102	-003	21.5	LEF01	M	S	S	S	S	S	S									1				PRIMARY CONTACT	559.4	0
Ouachita River	8040102	-004	15.8		E	S	S	S	S	S	S									1				SECONDARY CONTACT	559.4	0
Ouachita River	8040102	-005	0.6		E	S	S	S	S	S	S									1				DRINKING SUPPLY	559.4	0
Ouachita River	8040102	-006	12.1	OUA30	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	559.4	0
Ouachita River	8040102	-007	14.5	OUA06A+	M	S	S	S	S	S	S									1						
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	OUA23	M	S	N	S	S	S	S	UN	UN			Zn	Cu			5c	5c					
Caney Creek	8040102	-017	12.5		U															3						
Caddo River	8040102	-018	4.1		E	S	N	S	S	S	S	UN	UN			Zn	Cu			5c	5c					
Caddo River	8040102	-019	7.7		E	S	N	S	S	S	S	UN	UN			Zn	Cu			5c	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	OUA44	M	S	N	S	S	S	S	RE	RE			Zn	Cu			5a	5a					
D.C. Creek	8040102	-923	5	OUA44T	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		U															3						
Deceiper Cr.	8040102	-027	24.4	DPC01	M	S	S	S	S	S	S									1						
Bayou Freeo	8040102	-028	33.9	FRE01	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	OUA169	M	S	S	S	S	S	S									1						
Cypress Creek	8040102	-801	30	OUA170	M	S	S	S	S	S	S									1						
Ouachita River	8040102	-030	12		E	S	S	S	S	S	S									1						
Cove Creek	8040101	901	9.6	OUA159	M	S	N	S	S	S	S	RE	RE	RE		pH	Zn	Cu		5c	5c	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.ForkOuachita	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	OUA21	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	OAR01	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	OAR01	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		U															3						
Kates Creek	8040101	-041	8.2		U															3						
S.Fork Ouachita	8040101	-043	22.5	SFO01	M	S	S	S	S	S	S									1						
Mazarn Creek	8040101	-045	23.3	MZC01	M	S	S	S	S	S	S									1						
Little Mazarn	8040101	-047	14.8	SFM01	M	S	S	S	S	S	S									1						
Prairie Creek	8040101	-048	10	OUA40	M	S	N	S	S	S	S	UN				SI				5d						

TOTAL MILES	632.5
MILES UNASSESSED	73.1
MILES EVALUATED	240.7
MILES MONITORED	318.7

Figure A-22: Planning Segment 2F – NPDES Permitted Facilities





(Segment 2F)

Table A-64: Segment 2F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000523	US VANADIUM CORP-STRATCOR	LAKE CATHERINE (1,2,3)/WILSON CR (5)	8040101	2F
AR0000531	REYNOLDS METALS CO-GUM SPRINGS	OUACHITA R	8040102	2F
AR0000833	WEYERHAEUSER CO-MOUNTAIN PINE	GLAZYPEAU CR	8040101	2F
AR0000850	MOUNTAIN VALLEY SPRING CO	TRIB,GLAZYPEAU CR,OUACHITA R	8040101	2F
AR0000868	HOT SPRING CO-JONES MILL WWTF	COVE CR	8040102	2F
AR0001147	ENTERGY AR, INC-LAKE CATHERINE	LAKE CATHERINE,OUACHITA R	8040101	2F
AR0001201	BICC GENERAL CABLE IND, INC	TRIB, COVE CR	8040102	2F
AR0020109	USDAFS-OUACHITA CCC	OUACHITA R	8040101	2F
AR0020222	USA-COE IRON MOUNTAIN REC AREA-DEGRAY	DEGRAY LAKE	8040102	2F
AR0020231	USA-COE SHOUSE FORD REC AREA	DEGRAY LAKE	8040102	2F
AR0020605	ARKADELPHIA, CITY OF	OUACHITA R	8040102	2F
AR0021539	MOUNTAIN PINE, CITY OF	GLAZYPEAU CR,OUACHITA R	8040101	2F
AR0022781	USA-COE SPILLWAY REC AREA-OUAC	LAKE OUACHITA	8040101	2F
AR0022799	USA-COE LITTLE FIR REC AREA-	LAKE OUACHITA	8040101	2F
AR0022802	USA-COE BRADY MOUNTAIN REC AREA-OUA	LAKE OUACHITA	8040101	2F
AR0033855	MOUNT IDA, CITY OF	S FORK OUACHITA R, OUACHITA R	8040101	2F
AR0033880	HOT SPRINGS, CITY OF (HOT SPGS	LAKE CATHERINE	8040101	2F
AR0034126	MALVERN, CITY OF	OUACHITA R	8040102	2F
AR0035394	USA-COE DENBY POINT REC AREA	LAKE OUACHITA	8040101	2F
AR0035408	USA-COE TOMPKINS BEND REC AREA	LAKE OUACHITA	8040101	2F
AR0035416	USA-COE CRYSTAL SPRINGS REC AR	LAKE OUACHITA	8040101	2F

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0035424	USA-COE JOPLIN RECREATION AREA	LAKE OUACHITA	8040101	2F
AR0035432	USA-COE CADDO DRIVE REC AREA-	DEGRAY LAKE	8040102	2F
AR0035459	USA-COE ALPINE RIDGE REC AREA-	DEGRAY LAKE,CADDO R	8040102	2F
AR0035645	GLENWOOD, CITY OF	CADDO R	8040102	2F
AR0035939	SPARKMAN, CITY OF	TRIB,CYPRESS CR,OUACHITA R	8040102	2F
AR0036013	USA-COE ARLIE MOORE REC AREA-	DEGRAY LAKE,CADDO R,OUACHITA R	8040102	2F
AR0036021	USA-COE SPILLWAY REC AREA-DEGR	DEGRAY LAKE	8040102	2F
AR0036609	TREMONT CORP - FORMERLY NL IND	BLACR VALLEY CR TRIB,S FK CADDO R	8040102	2F
AR0036692	MENA, CITY OF	TRIB,PRAIRIE CR,QUACHITA R	8040101	2F
AR0036749	ARKADELPHIA HUMAN DEV CTR	CADDO R TRIB	8040102	2F
AR0037061	AR PARKS & TOURISM-LAKE DEGRAY	DEGRAY LAKE	8040102	2F
AR0036811	AR PARKS & TOURISM-LAKE OUACHITA	LAKE OUACHITA	8040101	2F
AR0038121	AR PARKS & TOURISM-LAKE CATHERIN	LAKE CATHERINE,OUACHITA R	8040101	2F
AR0038270	BAKER-HUGHES INTEQ	SOUTH FORK CADDO R	8040102	2F
AR0039403	HARBOR EAST POA	DITCH,LAKE OUACHITA	8040101	2F
AR0040801	SHANGRI-LA RESORT	LAKE OUACHITA	8040101	2F
AR0041050	CHURCH OF NAZARENE-HEATH VALLE	MACKS CR	8040101	2F
AR0041319	MILL POND VILLAGE-GARLAND CO	SORRELLS CR,LAKE HAMILTON	8040101	2F
AR0042293	HARBOR SOUTH DEVELOPMENT POA	LAKE OUACHITA TRIB	8040101	2F
AR0043125	NORMAN, CITY OF	CADDO R	8040102	2F
AR0043354	ACME BRICK COMPANY-PERLA FACIL	TOWN CR,OUACHITA R	8040102	2F
AR0044172	WESTWOOD VILLAGE POA	LAKE HAMILTON	8040101	2F
AR0044814	GS ROOFING PRODUCTS CO-SLATE	FIVE MILE CR	8040102	2F
AR0045128	MCCLARD SHOPPING CTR	TRIB,LOST CR,LAKE HAMILTON	8040102	2F

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0045411	CADDO VALLEY, CITY OF	CADDO R	8040102	2F
AR0045501	AR HWY DEPT-SOCIAL HILL REST A	TRIB,OUACHITA R,2F-OUACHITA RB	8040102	2F
AR0045438	RIVIERA UTILITIES OF AR, INC	OUACHITA R	8040101	2F
AR0045594	MOUNT IDA RETIREMENT CTR	TRIB,TWIN CR,LAKE OUACHITA	8040101	2F
AR0045624	LAKE HAMILTON SCHOOL DIST #5	LOST CR TRIB	8040101	2F
AR0045829	O’BRIEN’S PIZZA PUB	GLAZYPEAU CR TRIB	8040101	2F
AR0046612	BRAZEALE LUMBER CO	TRIB,BRUSHY CR,OUACHITA R	8040102	2F
AR0047139	RAY WHITE LUMBER CO	TRIB,CYPRUS CR,OUACHITA R	8040102	2F
AR0047228	MALVERN MINERALS-HOT SPRINGS	TRIB,E GULPHA CR,LAKE CATHERINE	8040101	2F
AR0047856	SHIELDS WOOD PRODUCTS, INC	TRIB,OUACHITA R	8040102	2F
AR0047881	WELLS RBS TRAVEL CENTER	TRIB,DECEIPER CR, OUACHITA R	8040102	2F
AR0048020	DONALDSON, TOWN OF	OUACHITA R,2F-OUACHITA RB	8040102	2F
AR0048241	LAKE CENTER GROCERY	BIG HILL CR,DEGRAY LAKE	8040102	2F
AR0048275	CAMP OZARK	TRIB/OUACHITA R	8040101	2F
AR0048615	DIAMONDHEAD RESORT-RIVIERA UTI	TRIB,LAKE CATHERINE	8040101	2F
AR0048755	ENTERGY AR, INC-CARPENTER DAM	OUACHITA R	8040101	2F
AR0048763	ENTERGY AR, INC-REMMEL DAM	OUACHITA R	8040101	2F
AR0048950	UMETCO MINERALS CORP-WILSON MI	WILSON CR, LAKE CATH	8040101	2F
AR0049026	GARLAND GASTON LUMBER CO	BRUSHY CR, OUACHITA R	8040102	2F
AR0049115	MAGIC SPRINGS DEVELOPMENT CO	TRIB,GULPHA CR,LAKE CATHERINE	8040101	2F
AR0049417	DUKE ENERGY HOT SPRINGS, LLC	OUACHITA R	8040102	2F

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	39	8.87	7.10	11.00	0.82
BOD_5 (mg/L)	40	0.64	0.09	2.30	0.38
pH (standard units)	40	7.19	6.91	7.41	0.11
Total Organic Carbon (mg/L)	39	3.48	2.62	5.50	0.63
Ammonia as N (mg/L)	44	0.02	<0.005	0.07	0.02
NO_2+NO_3 as N (mg/L)	44	0.24	0.1	0.49	0.08
Orthophosphate as P (mg/L)	44	0.01	<0.005	0.04	0.01
Total phosphorus as P (mg/L)	41	0.04	0.01	0.19	0.03
Total hardness (mg/L)	19	22.42	18	26.00	2.32
Chloride (mg/L)	44	2.74	2	3.66	0.46
Sulfate (mg/L)	43	9.92	4.64	19.00	3.32
Total dissolved solids (mg/L)	38	51.32	40.5	63.50	6.33
Total suspended solids (mg/L)	37	4.58	<1.0	27.00	4.45
Turbidity (NTU)	43	4.8	1.6	30.00	4.38

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.96	4.95	14.17	2.18
BOD_5 (mg/L)	57	0.67	-0.02	4.06	0.61
pH (standard units)	58	6.89	5.82	7.78	0.44
Total Organic Carbon (mg/L)	56	3.09	1.36	8.84	1.56
Ammonia as N (mg/L)	59	0.01	<0.005	0.10	0.02
NO_2+NO_3 as N (mg/L)	58	0.19	<0.01	1.39	0.24
Orthophosphate as P (mg/L)	59	0.01	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	55	0.04	0.01	0.30	0.05
Total hardness (mg/L)	32	24.43	14	40.00	7.26
Chloride (mg/L)	59	2.38	1.35	4.53	0.48
Sulfate (mg/L)	60	4.31	2.92	8.90	0.98
Total dissolved solids (mg/L)	47	45.69	32	62.00	7.60
Total suspended solids (mg/L)	47	3.96	<1.0	18.00	3.59
Turbidity (NTU)	59	7.53	1.6	29.50	6.00

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	8.36	6.60	11.10	1.10
BOD_5 (mg/L)	56	0.67	0.00	2.35	0.45
pH (standard units)	57	7.44	6.87	7.71	0.17
Total Organic Carbon (mg/L)	52	2.37	1.03	7.16	1.00
Ammonia as N (mg/L)	60	0.02	<0.005	0.14	0.03
NO_2+NO_3 as N (mg/L)	60	0.18	<0.01	0.95	0.19
Orthophosphate as P (mg/L)	60	0.02	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	57	0.04	0.01	0.23	0.03
Total hardness (mg/L)	28	37.73	<1.0	55.00	12.86
Chloride (mg/L)	60	2.45	1.54	3.54	0.37
Sulfate (mg/L)	59	5.76	3.94	25.20	2.90
Total dissolved solids (mg/L)	48	60.01	42	78.00	10.42
Total suspended solids (mg/L)	48	5.69	<1.0	49.00	7.23
Turbidity (NTU)	59	6.19	1.6	37.40	6.36

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	47	8.52	6.90	10.20	0.72
BOD_5 (mg/L)	55	0.79	0.03	2.46	0.50
pH (standard units)	54	7.29	6.98	7.67	0.13
Total Organic Carbon (mg/L)	50	3.55	2.63	6.20	0.72
Ammonia as N (mg/L)	59	0.03	<0.005	0.09	0.02
NO_2+NO_3 as N (mg/L)	59	0.24	0.085	0.48	0.08
Orthophosphate as P (mg/L)	59	0.01	<0.005	0.04	0.01
Total phosphorus as P (mg/L)	56	0.03	0.01	0.12	0.02
Total hardness (mg/L)	27	23.63	18	28.00	2.47
Chloride (mg/L)	59	2.76	1.97	3.98	0.49
Sulfate (mg/L)	58	10.19	4.63	19.00	3.53
Total dissolved solids (mg/L)	48	52.33	39.5	72.50	7.15
Total suspended solids (mg/L)	48	4.24	<1.0	26.50	3.85
Turbidity (NTU)	58	5.16	1.7	30.00	4.94

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.73	4.44	13.60	2.24
BOD_5 (mg/L)	57	1.97	0.42	7.65	1.46
pH (standard units)	58	6.67	6.09	7.41	0.35
Total Organic Carbon (mg/L)	56	4.93	2.3	10.89	1.96
Ammonia as N (mg/L)	59	0.22	<0.005	1.44	0.27
NO_2+NO_3 as N (mg/L)	58	0.51	0.055	1.54	0.33
Orthophosphate as P (mg/L)	59	0.05	<0.005	0.31	0.06
Total phosphorus as P (mg/L)	55	0.13	0.01	0.49	0.11
Total hardness (mg/L)	32	22.38	10	36.00	7.03
Chloride (mg/L)	59	9.16	1.82	28.20	7.04
Sulfate (mg/L)	60	18.53	3.28	67.20	17.35
Total dissolved solids (mg/L)	47	80.36	32	180.00	39.18
Total suspended solids (mg/L)	47	11.53	1	63.50	11.42
Turbidity (NTU)	59	15.27	2.6	68.00	13.83

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)	47	9.53	7.12	12.90	1.16
BOD_5 (mg/L)	53	0.55	0.00	2.06	0.52
pH (standard units)	54	7.19	6.53	7.42	0.15
Total Organic Carbon (mg/L)	48	1.44	<1.0	2.59	0.45
Ammonia as N (mg/L)	57	0.01	<0.005	0.07	0.01
NO_2+NO_3 as N (mg/L)	57	0.07	<0.01	0.23	0.04
Orthophosphate as P (mg/L)	57	0.01	<0.005	0.04	0.01
Total phosphorus as P (mg/L)	54	0.02	0.006	0.11	0.02
Total hardness (mg/L)	27	22.52	16	27.00	3.24
Chloride (mg/L)	57	1.64	1.35	2.13	0.17
Sulfate (mg/L)	56	12.3	4.18	18.70	3.08
Total dissolved solids (mg/L)	45	46.5	31	74.00	6.55
Total suspended solids (mg/L)	45	1.79	<1.0	8.50	1.55
Turbidity (NTU)	56	3.44	1	17.00	3.02

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)	47	9.72	6.85	12.30	1.11
BOD_5 (mg/L)	53	0.48	0.00	7.04	1.12
pH (standard units)	54	7.13	6.11	7.45	0.19
Total Organic Carbon (mg/L)	48	1.19	<1.0	2.35	0.51
Ammonia as N (mg/L)	57	0.01	<0.005	0.31	0.04
NO_2+NO_3 as N (mg/L)	57	0.07	<0.01	0.30	0.06
Orthophosphate as P (mg/L)	57	0.01	<0.005	0.04	0.01
Total phosphorus as P (mg/L)	54	0.03	0.01	0.75	0.10
Total hardness (mg/L)	27	28.56	14	42.00	7.39
Chloride (mg/L)	56	1.79	1.36	3.92	0.46
Sulfate (mg/L)	54	15.43	4.2	25.00	4.50
Total dissolved solids (mg/L)	46	56.21	33	78.00	10.46
Total suspended solids (mg/L)	46	1.75	<1.0	6.50	1.24
Turbidity (NTU)	56	3.32	1	12.10	2.07

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)	43	9.05	6.90	13.50	1.07
BOD_5 (mg/L)	49	0.26	-0.18	1.15	0.31
pH (standard units)	47	6.25	4.26	7.88	0.71
Total Organic Carbon (mg/L)	45	1.28	<1.0	3.40	0.58
Ammonia as N (mg/L)	51	0.01	<0.005	0.10	0.01
NO_2+NO_3 as N (mg/L)	51	0.13	0.01	0.89	0.16
Orthophosphate as P (mg/L)	51	0.01	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	50	0.03	0.01	0.22	0.03
Total hardness (mg/L)	33	68.18	21	309.00	45.96
Chloride (mg/L)	52	3.23	1.76	14.60	2.67
Sulfate (mg/L)	50	81.1	7.8	1050.00	144.04
Total dissolved solids (mg/L)	38	115.22	42	200.50	32.69
Total suspended solids (mg/L)	38	6.06	<1.0	20.70	4.43
Turbidity (NTU)	51	4.22	<1.0	16.00	3.65

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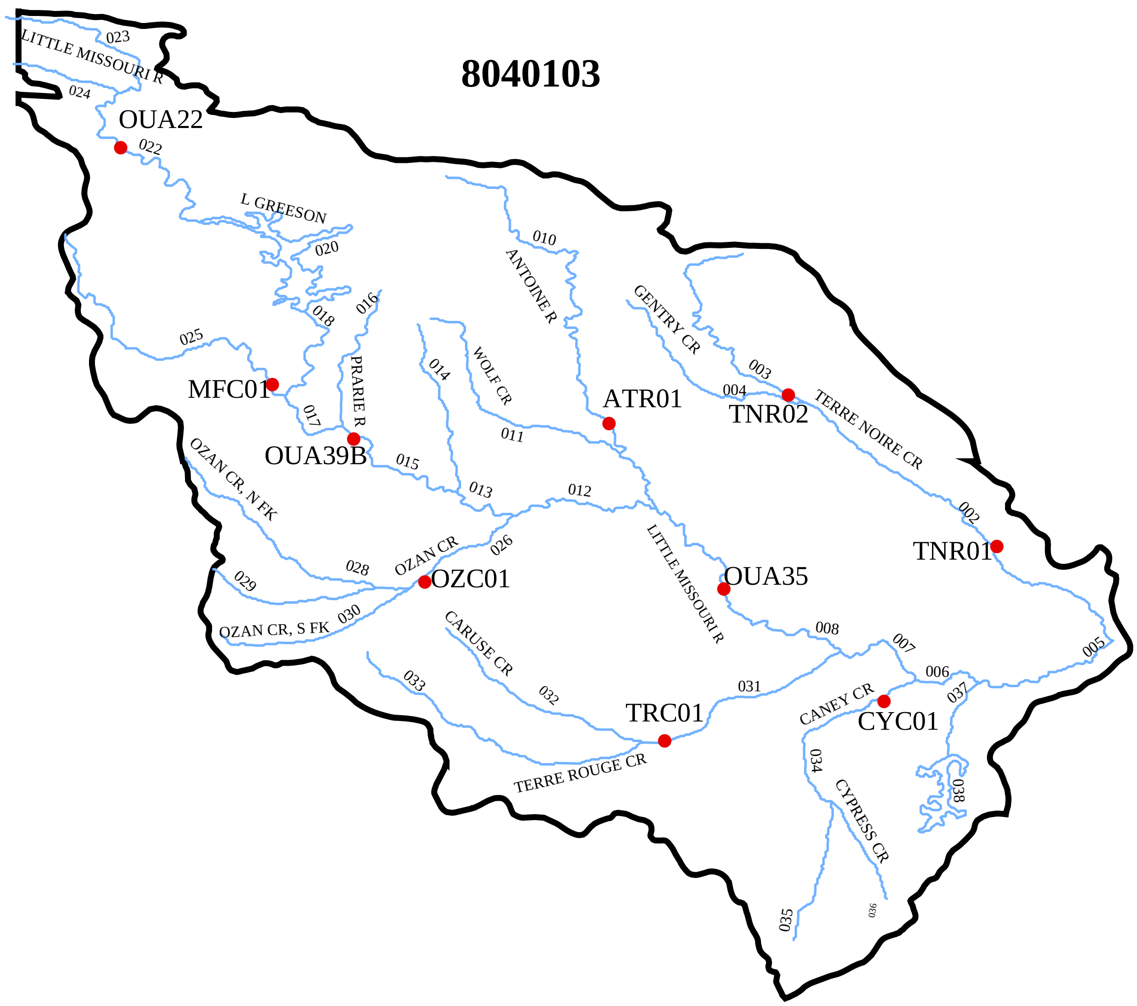
SEGMENT 2G LITTLE MISSOURI RIVER AND ANTOINE RIVER

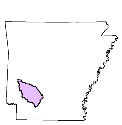
Segment 2G, located in the southwestern part of the State, covers most of Nevada and Pike Counties, large areas of Clark and Hempstead Counties, and small portions of Ouachita, Howard, Polk and Montgomery Counties. This segment encompasses the entire drainage area of the Little Missouri River with its 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 146.5 miles were evaluated bring the total number of miles assessed with in this segment to 354.6 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. All assessed stream reaches in the basin are meeting all designated uses and water quality criteria.

Figure A-23: Planning Segment 2G – Monitoring Stations



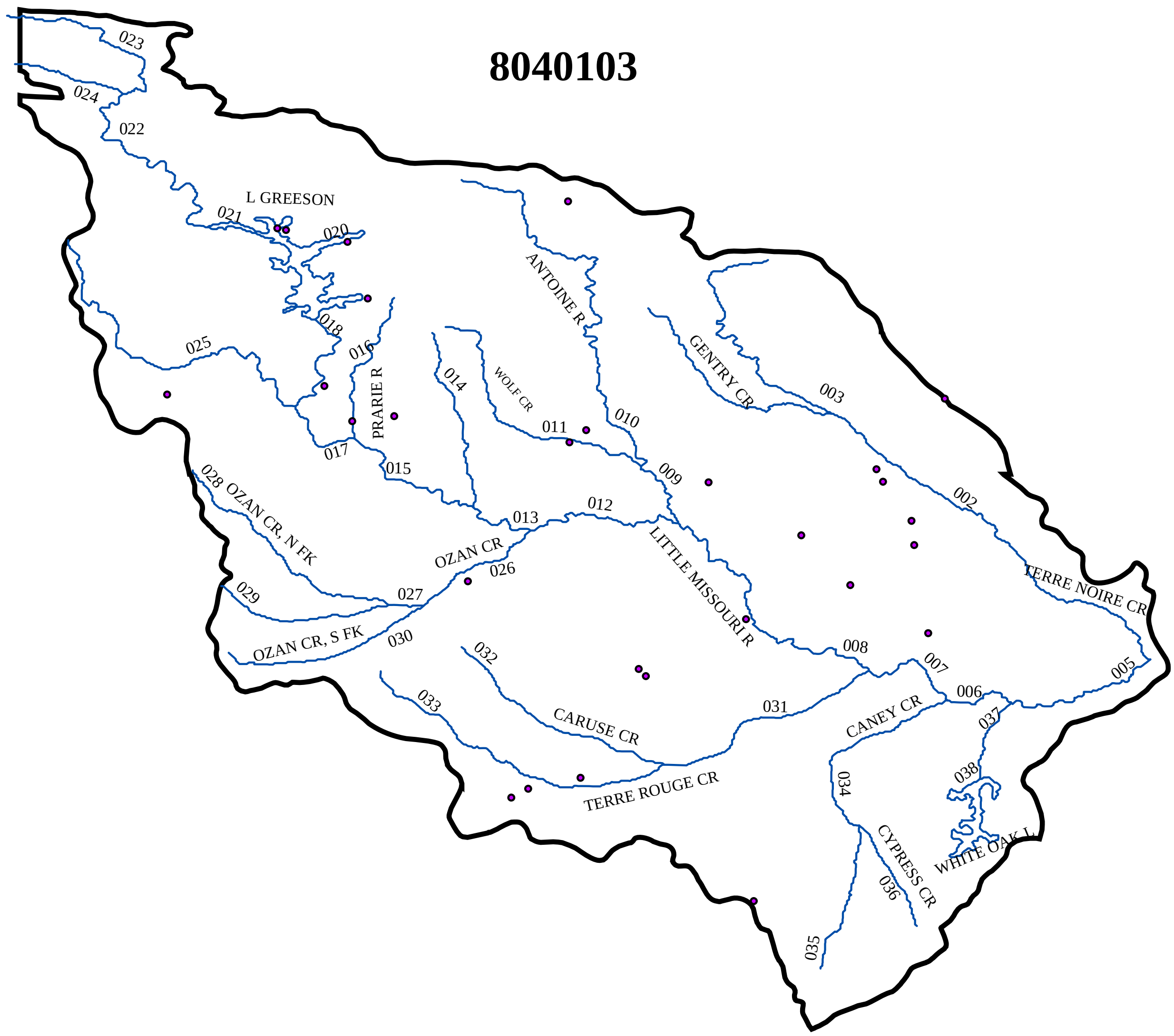


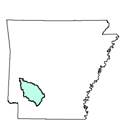
(Segment 2G)

Table A-73: Planning Segment 2G—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-2G																										
L. Missouri R.	8040103	-001	1.8		E	S	S	S	S	S	S									1				FISH CONSUMPTION	354.6	0
L. Missouri R.	8040103	-005	10.4		E	S	S	S	S	S	S									1				AQUATIC LIFE	354.6	0
L. Missouri R.	8040103	-006	4.6		E	S	S	S	S	S	S									1				PRIMARY CONTACT	354.6	0
L. Missouri R.	8040103	-007	7		E	S	S	S	S	S	S									1				SECONDARY CONTACT	354.6	0
L. Missouri R.	8040103	-008	19.6	OUA35	M	S	S	S	S	S	S									1				DRINKING SUPPLY	354.6	0
Terre Noire Cr.	8040103	-002	27.4	TNR01	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	354.6	0
Terre Noire Cr.	8040103	-003	19.6	TNR02	M	S	S	S	S	S	S									1						
Gentry Creek	8040103	-004	15.4		U															3						
Antoine River	8040103	-009	5.4		E	S	S	S	S	S	S									1						
Antoine River	8040103	-010	31.6	ATR01	M	S	S	S	S	S	S									1						
Wolf Creek	8040103	-011	18		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		E	S	S	S	S	S	S									1						
L. Missouri R.	8040103	-015	10.5	OUA39B	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	OUA22	M	S	S	S	S	S	S									1						
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	MFC01	M	S	S	S	S	S	S									1						
Ozan Creek	8040103	-026	8.6	OZC01	M	S	S	S	S	S	S									1						
Ozan Creek	8040103	-027	2		U															3						
N. Fork Ozan	8040103	-028	16.4		U															3						
M. Fork Ozan	8040103	-029	10.9		U															3						
S. Fork Ozan	8040103	-030	13		U															3						
Terre Rouge	8040103	-031	14.5	TRC01	M	S	S	S	S	S	S									1						
Caruse Creek	8040103	-032	15.2		U															3						
Terre Rouge	8040103	-033	20.7		M	S	S	S	S	S	S									1						
Caney Creek	8040103	-034	13.6	CYC01	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	72.9																									
MILES EVALUATED	146.5																									
MILES MONITORED	208.1																									

Figure A-24: Planning Segment 2G – NPDES Permitted Facilities





(Segment 2G)

Table A-74: Segment 2G Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000612	FIRESTONE BUILDING PRODUCTS CO	GARLAND CR & PINE CR	8040103	2G
AR0000906	POTLATCH CORP-OZAN UNIT	MILL CR,TERRE ROUGE CR,LITTLE MISSOURI	8040103	2G
AR0020729	JAMES HARDIE GYPSUM, INC	BLUFF CR,MUDDY FORK CR-LITTLE MISSOURI	8040103	2G
AR0021521	AMITY, CITY OF	LITTLE ANTOINE CR-R,LITTLE MISSOURI R	8040103	2G
AR0022551	GURDON, CITY OF	CANEY CR,TERRE NOIR CR,LITTLE MISSOURI R	8040103	2G
AR0022764	USA-COE KIRBY LANDING REC AREA	LAKE GREESON	8040103	2G
AR0022772	USA-COE SELF CR REC AREA-GREES	LAKE GREESON	8040103	2G
AR0033481	PRESCOTT, CITY OF	TRIB/SEWER CR,TERRE ROUGE CR,LITTLE MISSOURI R	8040103	2G
AR0036048	USA-COE COWHIDE COVE REC AREA-	LAKE GREESON	8040103	2G
AR0037796	INTERNATIONAL PAPER CO-GURDON	DITCH-HWY 67N,CANEY CR,TERRE NOIRE CR	8040103	2G
AR0038113	AR PARKS & TOURISM-DAISY STATE	LAKE GREESON	8040103	2G
AR0038458	HOPE, CITY OF-PATE CREEK WWTP	PATE CR,TERRE ROUGE CR,LITTLE MISSOURI R	8040103	2G
AR0040339	INTERNATIONAL PAPER CO-WHELEN	DITCH,TRIB,WEST FORK BEECH CR	8040103	2G
AR0041432	DELIGHT, CITY OF	WOLF CR	8040103	2G
AR0041688	BLEVINS, CITY OF	TRIB,OZAN CR,LITTLE MISSOURI R	8040103	2G
AR0041815	EMMET, CITY OF	TERRE ROUGE CR,LITTLE MISSOURI R,OUACHITA R	8040103	2G
AR0042439	NEVADA SCHOOL DIST #1	TRIB,MID CANEY CR,LITTLE MISSOURI R	8040103	2G
AR0043281	MURFREESBORO, CITY OF	LITTLE MISSOURI R	8040103	2G
AR0043818	HANSON AGGREGATES WEST, INC	WOLF CR,ANTOINE CR,LITTLE MISSOURI R	8040103	2G
AR0044270	AR HWY DEPT-GURDON REST AREA	TRIB,BOGGY CR	8040103	2G
AR0045551	DEATON’S SOUTHFORK TRUCK STOP	SOUTH BOAT DITCH,TERRE NOIR CR TRIB	8040103	2G

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0047155	R.D. PLANT CONTRACTING CO	LITTLE MISSOURI R	8040103	2G
AR0047180	PERRYTOWN, CITY OF	PATE CR,TERRE ROUCH CR,LITTLE MISSOURI R	8040103	2G
AR0047546	ANTHONY TIMBERLANDS, INC	MCNEELEY CR,LITTLE MISSOURI R	8040103	2G
AR0048038	DIAMOND OPERATIONS, INC	PARKER CREEK TRIB,PRAIRIE CR	8040103	2G
AR0048551	OKOLONA, CITY OF-WWTP	LITTLE MISSOURI R TRIB	8040103	2G
AR0049395	HANSON AGGREGATES-PRESCOTT PLA	UPPER DITCH,LITTLE MISSOURI R	8040103	2G

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	9.27	7.06	10.90	0.86
BOD_5 (mg/L)	56	0.4	0.00	1.45	0.35
pH (standard units)	57	7.11	6.90	7.44	0.17
Total Organic Carbon (mg/L)	51	1.31	<1.0	2.52	0.45
Ammonia as N (mg/L)	60	0.01	<0.005	0.06	0.01
NO_2+NO_3 as N (mg/L)	60	0.08	<0.01	0.28	0.06
Orthophosphate as P (mg/L)	60	0.01	<0.005	0.13	0.02
Total phosphorus as P (mg/L)	57	0.02	0.01	0.21	0.03
Total hardness (mg/L)	28	16.07	7	26.00	5.15
Chloride (mg/L)	60	1.61	1.3	2.12	0.19
Sulfate (mg/L)	59	3.51	2.67	4.77	0.44
Total dissolved solids (mg/L)	48	33.56	23	50.00	5.93
Total suspended solids (mg/L)	48	1.69	<1.0	8.20	1.57
Turbidity (NTU)	59	2.52	<1.0	12.10	1.97

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.75	4.77	18.74	2.52
BOD_5 (mg/L)	58	0.94	0.00	2.55	0.58
pH (standard units)	59	6.94	5.37	7.99	0.51
Total Organic Carbon (mg/L)	56	4.6	2.37	11.60	2.21
Ammonia as N (mg/L)	61	0.02	<0.005	0.10	0.02
NO_2+NO_3 as N (mg/L)	61	0.17	<0.01	0.89	0.16
Orthophosphate as P (mg/L)	61	0.02	<0.005	0.07	0.01
Total phosphorus as P (mg/L)	57	0.08	0.01	1.21	0.16
Total hardness (mg/L)	31	25.55	12	57.00	11.30
Chloride (mg/L)	60	2.92	1.82	5.38	0.75
Sulfate (mg/L)	60	8.4	3.35	44.60	6.14
Total dissolved solids (mg/L)	47	57.6	35	96.00	17.06
Total suspended solids (mg/L)	46	15.41	2.5	75.30	16.48
Turbidity (NTU)	58	22.75	7.1	289.00	37.96

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	8.64	6.40	11.50	1.16
BOD_5 (mg/L)	55	0.84	0.02	7.07	1.03
pH (standard units)	55	7.03	6.36	9.90	0.48
Total Organic Carbon (mg/L)	51	3.64	1.32	12.60	2.07
Ammonia as N (mg/L)	58	0.02	<0.005	0.09	0.02
NO_2+NO_3 as N (mg/L)	58	0.2	<0.01	0.61	0.13
Orthophosphate as P (mg/L)	58	0.01	<0.005	0.07	0.01
Total phosphorus as P (mg/L)	54	0.03	0.01	0.24	0.04
Total hardness (mg/L)	27	28.74	9	216.00	38.61
Chloride (mg/L)	58	2.53	1.35	4.67	0.74
Sulfate (mg/L)	57	15.09	3.24	185.00	28.30
Total dissolved solids (mg/L)	47	55.81	27	209.00	31.62
Total suspended solids (mg/L)	46	3.99	<1.0	13.00	2.79
Turbidity (NTU)	57	7.84	1.11	140.00	18.21

Arkansas River Basin

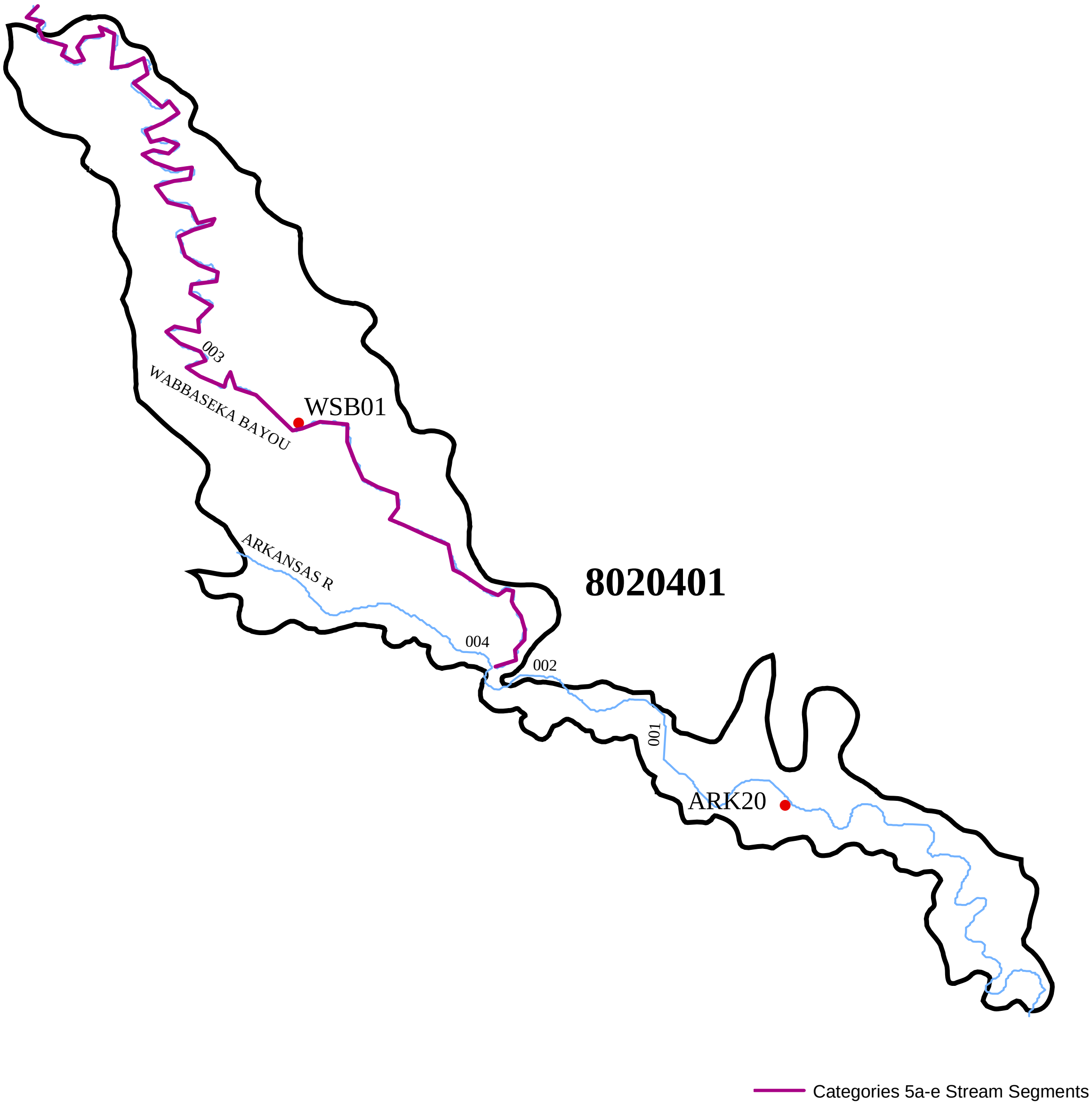
SEGMENT 3A — LOWER ARKANSAS RIVER

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. The data indicate that all designated uses are being maintained, although there was some concern for elevated bacteria and nutrients found in Wabbaseka Bayou.

Figure A-25: Planning Segment 3A – Monitoring Stations

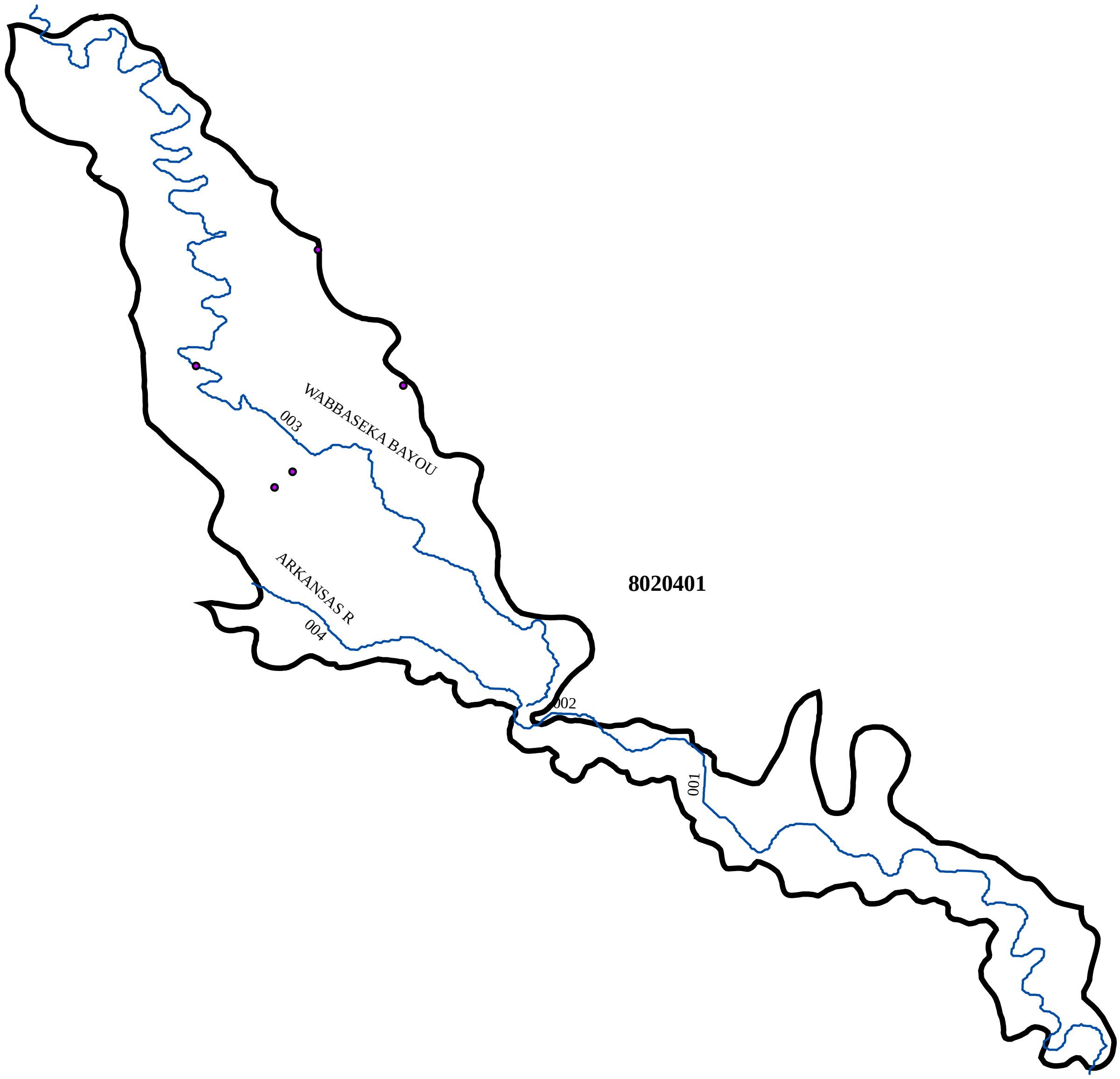


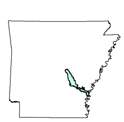
(Segment 3A)

Table A-78: Planning Segment 3A—Designated Use Attainment Status

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-3A																										
Arkansas River	8020401	-001	52.2	ARK20	M	S	S	S	S	S	S									1				FISH CONSUMPTION	186.6	0
Arkansas River	8020401	-002	13.3		E	S	S	S	S	S	S									1				AQUATIC LIFE	84.9	101.7
Wabbaseka B.	8020401	-003	101.7	WSB01	M	S	N	S	S	S	S	AG	UN			SI	DO			5b	5d			PRIMARY CONTACT	186.6	0
Arkansas River	8020401	-004	19.4		E	S	S	S	S	S	S									1				SECONDARY CONTACT	186.6	0
TOTAL MILES	186.6																							DRINKING SUPPLY	186.6	0
MILES UNASSESSED	0																							AGRI & INDUSTRY	186.6	0
MILES EVALUATED	32.7																									
MILES MONITORED	153.9																									

Figure A-26: Planning Segment 3A – NPDES Permitted Facilities





(Segment 3A)

Table A-79: Segment 3A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0034771	ALTHEIMER, CITY OF	ARKANSAS R	8020401	3A
AR0035980	AR DEPT OF CORRECTION-TUCKER	LAGOON/WABBASEKA BAYOU/ARKANSAS R/3B-ARKANSAS RB	8020401	3A
AR0039896	WABBASEKA, CITY OF	TRIB,BRADLEY SLOUGH,3B-ARKANSAS RB	8020401	3A

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	8.33	5.50	11.53	1.35
BOD_5 (mg/L)	55	1.44	0.29	3.59	0.67
pH (standard units)	54	7.62	6.47	8.73	0.49
Total Organic Carbon (mg/L)	52	5.53	2.55	7.70	0.94
Ammonia as N (mg/L)	57	0.05	<0.005	0.45	0.07
NO_2+NO_3 as N (mg/L)	58	0.34	<0.01	0.85	0.24
Orthophosphate as P (mg/L)	57	0.07	0.017	0.59	0.08
Total phosphorus as P (mg/L)	53	0.13	0.047	0.35	0.07
Total hardness (mg/L)	28	120.5	42	177.00	31.81
Chloride (mg/L)	57	72.11	4.72	168.00	35.49
Sulfate (mg/L)	58	48.13	6.47	97.60	22.69
Total dissolved solids (mg/L)	45	290.8	120	447.50	94.96
Total suspended solids (mg/L)	45	25.43	<1.0	215.50	40.39
Turbidity (NTU)	57	27.84	2.9	240.00	36.71

SEGMENT 3B BAYOU METO AND TRIBUTARIES

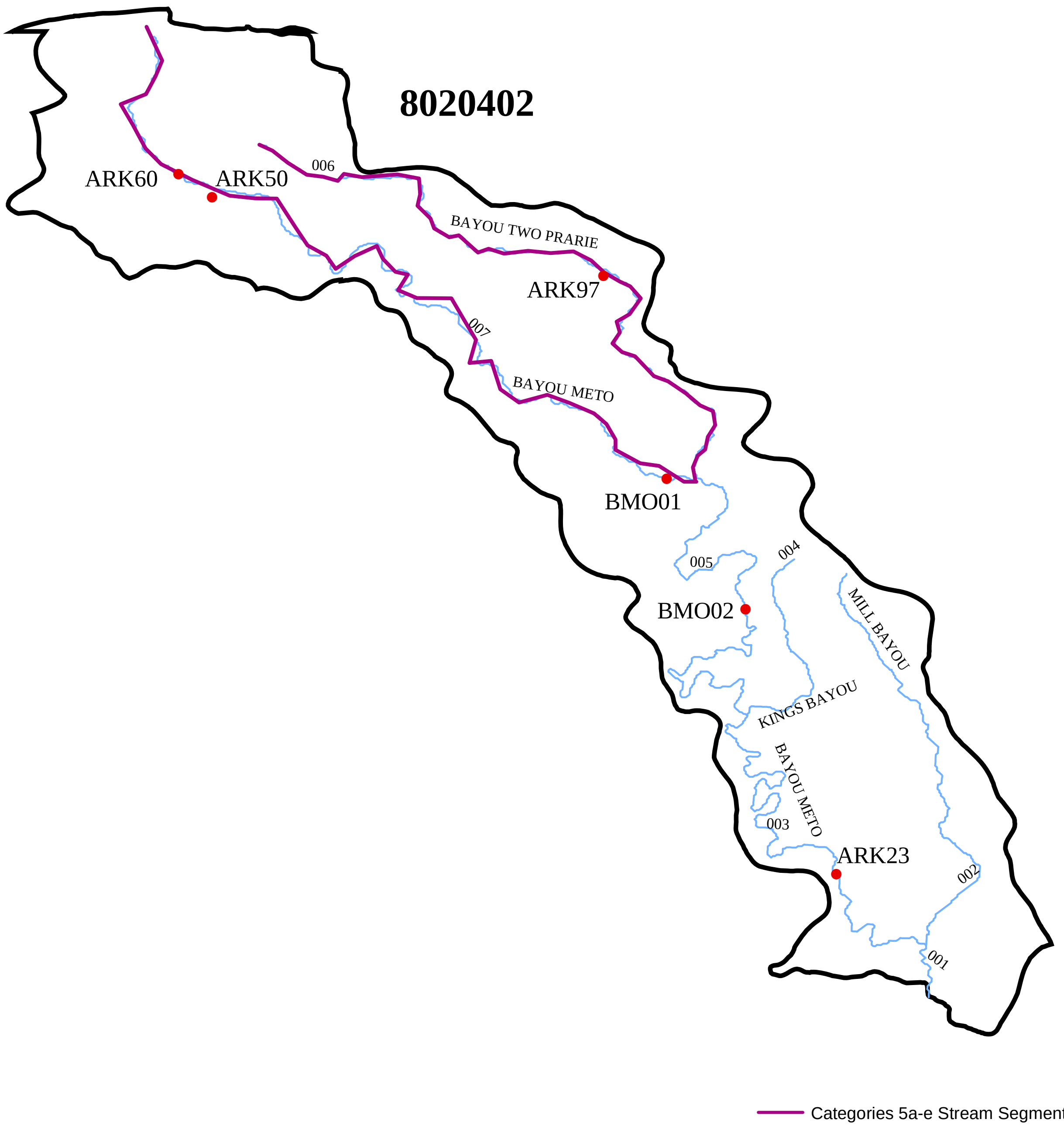
Segment 3B is located in the east central portion of Arkansas and includes a major portion of Lonoke County, as well as parts of Arkansas, Jefferson, Faulkner, Pulaski and Prairie Counties. Bayou Meto and its tributaries comprise the major surface water resource in the segment. Major tributaries include 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 242.3 stream miles, of which the majority is being assessed. This report uses monitoring data from four monthly stations and one quarterly station to assess 191.7 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 due to the presence of dioxin in fish tissue. The source has been eliminated and the contamination is being addressed through natural attenuation. One of the most common complaints concerning this stream is that pumping water from the Bayou for irrigation purposes is severely impairing the stream uses.

Figure A-27: Planning Segment 3B – Monitoring Stations

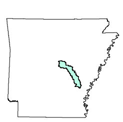


(Segment 3B)

Table A-81: Planning Segment 3B—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-3B																										
Bayou Meto	8020402	-001	4.3		E	S	S	S	S	S	S									1				FISH CONSUMPTION	130.3	65.7
Bayou Meto	8020402	-003	39.8	ARK23	M	S	S	S	S	S	S									1				AQUATIC LIFE	85.6	110.4
Bayou Meto	8020402	-005	41.5	BMO02	M	S	S	S	S	S	S									1				PRIMARY CONTACT	196	0
Bayou Meto	8020402	-007	65.7	ARK60,50	M	N	N	S	S	S	S	IP	IP	UN		PO	Pb	DO		4b	5d	5d		SECONDARY CONTACT	196	0
Mill Bayou	8020402	-002	31		U															3				DRINKING SUPPLY	196	0
Kings Bayou	8020402	-004	15.3		U															3				AGRI & INDUSTRY	196	0
B.Two Prairie	8020402	-006	44.7	ARK97	M	S	N	S	S	S	S	UN				DO				5d						
TOTAL MILES	242.3																									
MILES UNASSESSED	46.3																									
MILES EVALUATED	4.3																									
MILES MONITORED	191.7																									

Figure A-28: Planning Segment 3B – NPDES Permitted Facilities



(Segment 3B)

Table A-82: Segment 3B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000949	USAF-LITTLE ROCK AFB-JACKSONVILLE	CYPRUS BRANCH/JACK BAYOU/ARKANSAS R	8020402	3B
AR0001163	REMINGTON ARMS CO-LONOKE	BAYOU METO,ARKANSAS R	8020402	3B
AR0021661	CABOT, CITY OF	BAYOU TWO PRAIRIE TRIB,BAYOU METO	8020402	3B
AR0022284	HUMPHREY, CITY OF	LATERAL #5 DT,BEAR BAYOU, SALT BAYOU,ARKANSAS RB	8020402	3B
AR0022390	GILLETT, CITY OF	FLAG LAKE SLOUGH, FLAG LAKE	8020402	3B
AR0033642	GRAVEL RIDGE SID #213	KELLOGG CR TRIB,BAYOU METO	8020402	3B
AR0033740	CARLISLE, CITY OF	BAYOU TWO PRAIRIE/BAYOU METO/ARKANSAS R	8020402	3B
AR0034380	STUTTGART, CITY OF	KING BAYOU,BAYOU METO,ARKANSAS R	8020402	3B
AR0034746	LONOKE, CITY OF	BAYOU TWO PRAIRIE/BAYOU METO/ARKANSAS R	8020402	3B
AR0037176	SHERWOOD, CITY OF INDIAN HEAD	KELLOGG CR TRIB,BAYOU METO	8020402	3B
AR0038075	RUNYAN SID #211	TRIB,KELLOGG CR,BAYOU METO,ARKANSAS R	8020402	3B
AR0040126	MACON P0A, INC	TRIB-CYPRESS BAYOU/SEG 3B-ARKANSAS R RB	8020402	3B
AR0041335	JACKSONVILLE SEWER COMMISSION	BAYOU METO, ARKANSAS R	8020402	3B
AR0041696	L'OREAL USA PRODUCTS, INC.	INK BAYOU TRIB, ARKANSAS R	8020402	3B
AR0043761	ALMYRA, CITY OF	MILL BAYOU, BIG BAYOU METO, ARKANSAS R	8020402	3B
AR0044318	SKEETER HOLE, LLC	INK BAYOU	8020402	3B
AR0044598	PCSSD - BAYOU METO ELEMENTARY	BAYOU METO	8020402	3B
AR0046311	FRESHOUR CONSTRUCTION CO, INC	TRIB, WHITE OAK BRANCH	8020402	3B
AR0046540	STONE VALLEY MHP	BAYOU METO	8020402	3B
AR0047309	ARKANSAS PRECAST CORP	TRIB, BAYOU METO, ARKANSAS R	8020402	3B
AR0048313	H. A. C. T. WW IMPROVEMENT DIST	CROOKED CR, BAYOU METO, ARKANSAS R	8020402	3B

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0041149	AR MILITARY DEPT-CAMP ROBINSON	5-MI CR,AR R,3C-ARKANSAS RB	8020402	3B

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	6.76	3.40	9.36	1.43
BOD_5 (mg/L)	56	2.4	0.42	6.77	1.32
pH (standard units)	55	7.3	5.87	8.84	0.62
Total Organic Carbon (mg/L)	53	9.35	5.201	15.71	2.42
Ammonia as N (mg/L)	58	0.05	<0.005	0.27	0.06
NO_2+NO_3 as N (mg/L)	59	0.17	<0.01	0.61	0.16
Orthophosphate as P (mg/L)	58	0.09	0.01	0.34	0.06
Total phosphorus as P (mg/L)	55	0.2	0.053	0.49	0.10
Total hardness (mg/L)	28	86.93	25	228.00	60.85
Chloride (mg/L)	59	24.86	3.9	100.16	22.91
Sulfate (mg/L)	60	15.58	3.36	81.12	14.91
Total dissolved solids (mg/L)	45	199.2	76.5	410.50	88.34
Total suspended solids (mg/L)	45	21.32	6	72.50	14.26
Turbidity (NTU)	59	43.87	7.3	180.00	37.91

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)	61	7.13	3.11	11.70	2.22
BOD_5 (mg/L)	57	1.67	0.34	5.36	0.83
pH (standard units)	60	6.95	6.33	8.84	0.36
Total Organic Carbon (mg/L)	55	6.25	2.6	9.18	1.53
Ammonia as N (mg/L)	61	0.09	<0.005	0.82	0.13
NO_2+NO_3 as N (mg/L)	62	2.08	0.107	8.40	2.28
Orthophosphate as P (mg/L)	61	0.72	0.012	3.39	0.86
Total phosphorus as P (mg/L)	57	0.85	0.062	3.24	0.85
Total hardness (mg/L)	31	37.03	13	134.00	23.00
Chloride (mg/L)	60	19.04	1.63	49.30	14.45
Sulfate (mg/L)	61	12.29	3.08	27.10	7.35
Total dissolved solids (mg/L)	47	127.01	37.5	264.00	71.27
Total suspended solids (mg/L)	46	24.58	3.2	266.80	39.95
Turbidity (NTU)	60	27.3	4.37	192.00	32.00

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)	59	5.84	2.02	13.40	2.99
BOD_5 (mg/L)	55	1.83	0.43	5.88	1.05
pH (standard units)	58	6.83	6.22	7.55	0.27
Total Organic Carbon (mg/L)	53	5.29	2.26	9.96	1.56
Ammonia as N (mg/L)	59	0.03	<0.005	0.24	0.04
NO_2+NO_3 as N (mg/L)	60	0.12	<0.01	0.70	0.14
Orthophosphate as P (mg/L)	59	0.01	<0.005	0.09	0.01
Total phosphorus as P (mg/L)	56	0.09	0.01	1.13	0.15
Total hardness (mg/L)	30	20.4	10	41.00	8.10
Chloride (mg/L)	58	3.99	1.19	7.67	1.12
Sulfate (mg/L)	59	4.68	1.2	15.40	2.31
Total dissolved solids (mg/L)	47	65.65	36	344.50	51.69
Total suspended solids (mg/L)	46	14.04	2.5	228.00	32.70
Turbidity (NTU)	58	16.16	4.4	78.00	10.92

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)	57	6.46	2.89	11.40	2.37
BOD_5 (mg/L)	55	2.98	0.90	7.30	1.64
pH (standard units)	57	7.03	6.37	7.73	0.30
Total Organic Carbon (mg/L)	53	9.77	4.852	17.50	2.18
Ammonia as N (mg/L)	59	0.11	<0.005	0.58	0.11
NO_2+NO_3 as N (mg/L)	60	0.37	0.042	0.98	0.22
Orthophosphate as P (mg/L)	59	0.58	0.018	7.33	1.16
Total phosphorus as P (mg/L)	55	0.79	0.087	7.06	1.21
Total hardness (mg/L)	30	73.2	15	140.00	39.24
Chloride (mg/L)	58	25.96	0.38	85.71	18.20
Sulfate (mg/L)	59	9.86	1.38	18.90	3.85
Total dissolved solids (mg/L)	47	177.27	64	376.00	77.37
Total suspended solids (mg/L)	46	27.63	4.2	287.60	42.28
Turbidity (NTU)	58	39.39	4	290.00	54.03

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

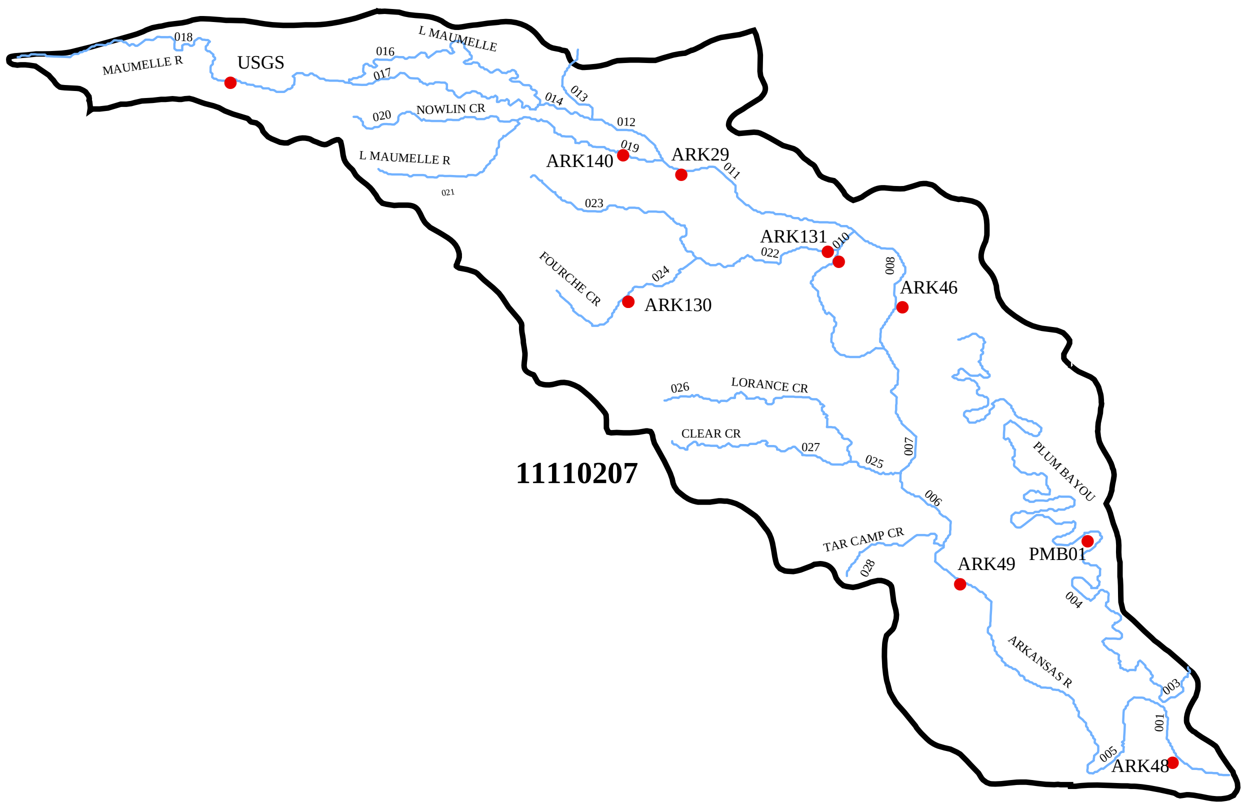
Segment 3C is located in central Arkansas and covers large portions of Pulaski and Jefferson Counties as well as small areas of Grant, Saline, Lonoke, and Perry Counties. The Arkansas River, with its tributaries, is the major surface water resource in this segment. The principal tributaries within this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

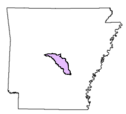
Summary of Water Quality Conditions

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 238.1 miles were assessed. Four monitoring stations are located on the main stem of the Arkansas River which provides monitored data for 57.3 miles of the river. An additional 21.1 miles of the Arkansas River were evaluated. Data from USGS studies on the Maumelle River was used to assess this stream. Quarterly monitoring was conducted at one station on Plum Bayou. The remaining 53.7 miles within this planning segment were unassessed.

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. All other assessed waters in this segment were meeting all designated uses.

Figure A-29: Planning Segment 3C – Monitoring Stations



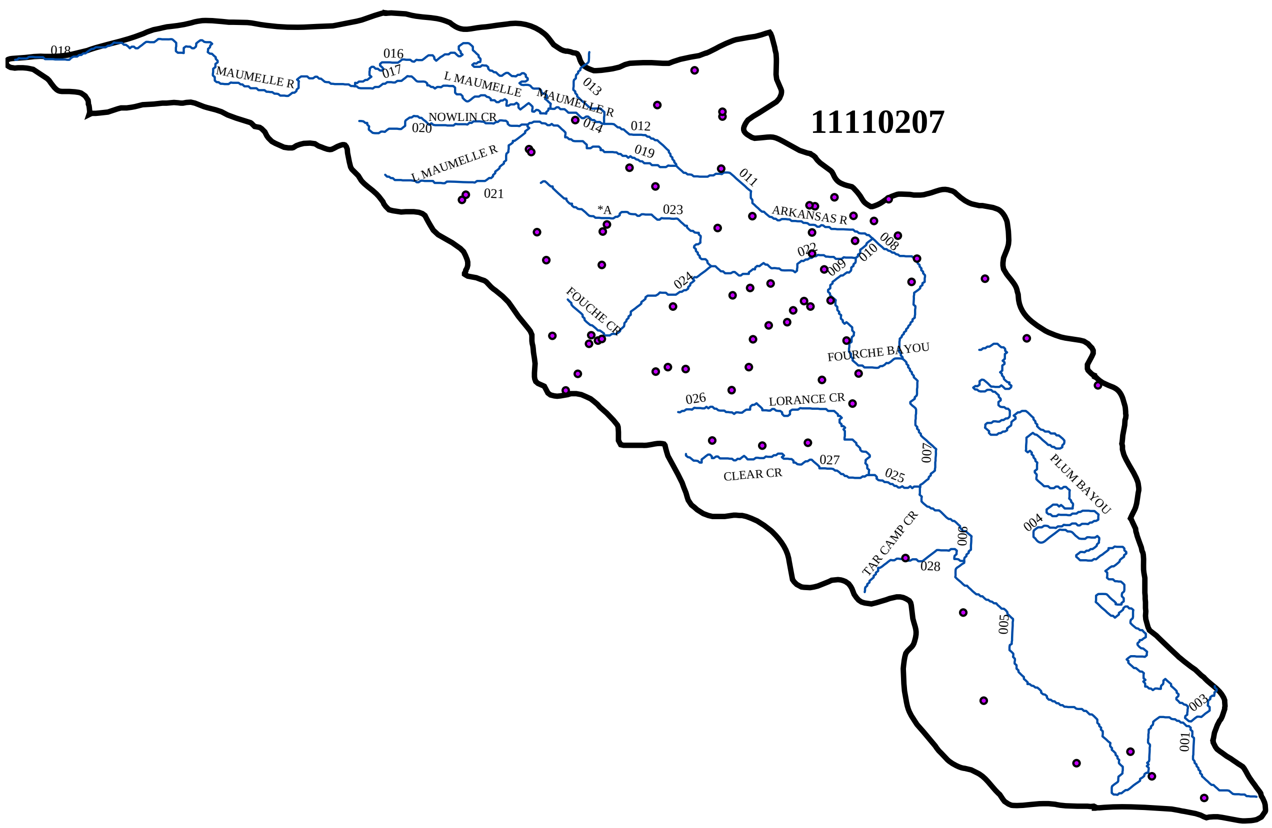


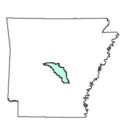
(Segment 3C)

Table A-87: Planning Segment 3C—Designated Use Attainment Status

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-3C																										
Arkansas River	11110207	-001	6.7	ARK48	M	S	S	S	S	S	S									1				FISH CONSUMPTION	238.1	0
Plum Bayou	11110207	-002	0.3		M	S	S	S	S	S	S									1				AQUATIC LIFE	238.1	0
Indian Bayou	11110207	-003	3.2		U															3				PRIMARY CONTACT	238.1	0
Plum Bayou	11110207	-004	68.4	PMB01	M	S	S	S	S	S	S									1				SECONDARY CONTACT	238.1	0
Arkansas River	11110207	-005	28	ARK49	M	S	S	S	S	S	S									1				DRINKING SUPPLY	238.1	0
Arkansas River	11110207	-006	6.2		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	238.1	0
Arkansas River	11110207	-007	9.2		E	S	S	S	S	S	S									1						
Arkansas River	11110207	-008	9.8	ARK46	M	S	S	S	S	S	S									1						
Fourche Bayou	11110207	-009	11		U															3						
Fourche Bayou	11110207	-010	1.6		U															3						
Arkansas River	11110207	-011	7.7	ARK29	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	ARK140	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	ARK131	M	S	S	S	S	S	S									1						
Rock Creek	11110207	-023	13		E	S	S	S	S	S	S									1						
Fourche Creek	11110207	-024	11.2	ARK130	M	S	S	S	S	S	S									1						
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	53.7																									
MILES EVALUATED	58																									
MILES MONITORED	180.1																									

Figure A-30: Planning Segment 3C – NPDES Permitted Facilities





(Segment 3C)

Table A-88: Segment 3C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0001376	ENTERGY AR, INC-LYNCH	ARKANSAS R	11110207	3C
AR0001414	MINNESOTA MINING & MFG-ARCH ST	TRIB,FOURCHE CR,AR R	11110207	3C
AR0001449	CELESTICA SERVICES, INC	TRIB/LITTLE FOURCHE CR	11110207	3C
AR0001503	MCGEORGE CONTRACTING CO, INC	TRIB-LITTLE FOURCH CR	11110207	3C
AR0001601	GAYLORD CONTAINER CORP	ARKANSAS R	11110207	3C
AR0001635	SMITH FIBERGLASS PRODUCTS-FIBE	TRIB,FOURCHE CR,ARKANSAS R	11110207	3C
AR0001643	GEORGIA PACIFIC-NLR	ARKANSAS R	11110207	3C
AR0001678	USA-PINE BLUFF ARSENAL-PINE BL	TRIB/PHILLIPS CR & ARKANSAS R	11110207	3C
AR0001686	MINNESOTA MINING & MFG-COLLEGE	TRIB,FOURCHE CR,ARKANSAS R	11110207	3C
AR0001775	UNION PACIFIC RAILROAD CO	EAST& WEST BRANCH DARK HOLLOW CANAL	11110207	3C
AR0001848	POROCEL CORP	BAUXITE PIT,DITCH/WILLOW SPR BRANCH/FOURCHE CR	11110207	3C
AR0001970	INTERNATIONAL PAPER CO-PINE BLUFF	ARKANSAS R-3C (1) &COUSART BAYOU-2B (2)	11110207	3C
AR0002542	ALLEN GRANITE INDUSTRIES, INC	TRIB/INK BAYOU	11110207	3C
AR0020303	NORTH LITTLE ROCK, CITY OF-FAULKNE	ARKANSAS R	11110207	3C
AR0020320	NORTH LITTLE ROCK WW UTILITY-5 MIL	ARKANSAS R	11110207	3C
AR0021806	LITTLE ROCK WW UTILITY-ADAMS F	ARKANSAS R	11110207	3C
AR0022128	ENGLAND, CITY OF	WABBASEKA BAYOU/PLUM BAYOU/ARKANSAS R	11110207	3C
AR0033316	PINE BLUFF WW UTILITY-BOYD PT	ARKANSAS R	11110207	3C
AR0033626	MAUMELLE SUBURBAN IMPROVEMENT	ARKANSAS R	11110207	3C
AR0035963	PCSSD-ROBINSON ELEM SCH	TRIB,LITTLE.MAUMELLE R	11110207	3C
AR0036331	ENTERGY AR, INC-WHITE BLUFF PL	ARKANSAS R	11110207	3C
AR0036421	FERNCLIFF CAMP & CONF CTR	TRIB,LITTLE MAUMELLE R,ARKANSAS R	11110207	3C

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0036447	GEO SPECIALTY CHEMICALS-WINROC	FISH CR	11110207	3C
AR0037338	BAKER APTS-CHASE PROPERTIES	PANTHER BRANCH,BRODIE CR,FOURCHE CR	11110207	3C
AR0037613	KEO, CITY OF	TRIB, NORTH BAYOU, PLUM BAYOU	11110207	3C
AR0037745	LITTLE ROCK ZOOLOGICAL GARDENS	COLEMAN CR	11110207	3C
AR0038181	CENTURY TUBE CORP	LAKE LANHOFER,ARKANSAS R	11110207	3C
AR0038288	NORTH LITTLE ROCK WW UTILITY-WHITE	ARKANSAS R	11110207	3C
AR0038571	AR PARKS & TOURISM -PINNACLE MOUNTAIN	DITCH,BIG MAUMELLE R	11110207	3C
AR0039250	AR 4-H EDUCATION CENTER-FERNDA	FERNDALE CR	11110207	3C
AR0039357	REDFIELD, CITY OF	ARKANSAS R	11110207	3C
AR0039543	MCALMONT CHURCH OF CHRIST-NLR	STARK BEND/FAULKNER LAKE	11110207	3C
AR0040177	LITTLE ROCK, CITY OF-FOURCHE C	ARKANSAS R	11110207	3C
AR0040266	ONE-FORTY-FIFTH ST WTR&SID#345	FISH CR (001) CANE CR (002)	11110207	3C
AR0040380	AR PARKS & TOURISM-TOLTEC MDS	TRIB/TERRE NOIR CR	11110207	3C
AR0040860	MAPLE CREEK POA-SID #1	MAPLE CR/PENNINGTON BAYOU	11110207	3C
AR0041149	AR MILITARY DEPT-CAMP ROBINSON	5-MILE CR, ARKANSAS R	11110207	3C
AR0041424	PLEASANT OAKS POA	TRIB/OTTER CR/FOURCHE CR	11110207	3C
AR0042544	CRILANCO OIL, INC	TRIB,FISH CR,BIG LAKE,PENNINGTON BAYOU	11110207	3C
AR0042862	SHERIDAN SCHOOL DIST-EAST END	TRIB,MCCRIGHT BRANCH,LORRANCE CR,BIG LAKE	11110207	3C
AR0042901	SYNGENTA CROP PROTECTION, INC	WEST BRANCH-DARK HOLLOW CANAL,ARKANSAS R	11110207	3C
AR0042927	PCSSD-AUXILIARY SERVICE FAC	FOURCHE BAYOU,ARKANSAS R	11110207	3C
AR0043079	STERLING PAINT, INC	6TH ST STRM SWR,ARKANSAS R	11110207	3C
AR0043826	WEYERHAUSER CO. DBA NORTHWEST	TRIB,FOURCHE CR,ARKANSAS R	11110207	3C

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0043893	PCSSD-ROBINSON HIGH SCH	DITCH, TRIB, LITTLE MAUMELLE R	11110207	3C
AR0043931	DIXON MANORMOBILE HOME PARK	TRIB,FISH CR,ARKANSAS R	11110207	3C
AR0044393	SUNSET ACRES SUBDIVISION	TRIB,LITTLE FOURCHE CR,FOURCHE CR	11110207	3C
AR0044601	PCSSD-FULLER ELEM SCH	TRIB/FISH CR	11110207	3C
AR0044610	PCSSD-LANDMARK ELEM SCH	TRIB,TREADWAY BRANCH,LORANCE CR	11110207	3C
AR0044628	PCSSD-LAWSON ELEM SCH	DITCH/TRIB/FOURCHE CR/ARKANSAS R	11110207	3C
AR0044750	PCSSD-OAK GROVE HIGH SCH	DITCH,NEWTON CR,WHITE OAK BAYOU	11110207	3C
AR0044881	SALINE CO WW & SANITARY SWR	CROOKED CR,FOURCHE CR,ARKANSAS R	11110207	3C
AR0045471	YOUTH HOME INC-GENESIS CAMPUS	MCHENRY CR,FOURCHE CR	11110207	3C
AR0045560	OASIS RENEWAL CENTER	BRODIE CR TRIB	11110207	3C
AR0045608	CENTRAL ARKANSAS SEWER SYSTEMS	WOODRUFF CR	11110207	3C
AR0046051	OWEN CREEK SUBDIVISION	OWEN CR,FOURCHE CR	11110207	3C
AR0046060	PULASKI COUNTY SID #221	FOURCHE BAYOU TRIB,ARKANSAS R	11110207	3C
AR0046086	BLEMS, INC	TRIB,NEWTON CR	11110207	3C
AR0046299	MAVERICK TRANSPORTATION CO-NLR	DITCH,STARK BEND TRIB,FAULKNER LAKE	11110207	3C
AR0046302	K MOBILE HOME PK	FOURCHE CR TRIB,ARKANSAS R	11110207	3C
AR0046370	WRIGHTSVILLE, CITY OF	FOURCHE BAYOU @ ARKANSAS R	11110207	3C
AR0046591	BEAZER EAST, INC-KOPPERS INDUS	DITCH,REDWOOD TUNNEL	11110207	3C
AR0046710	GRANITE MOUNTAIN QUARRIES	TRIBS OF FOURCHE CR/ARKANSAS R	11110207	3C
AR0046728	COULSON OIL-SHELL SUPERSTOP 38	TRIB, CROOKED CR, FOURCHE CR	11110207	3C
AR0046868	E. C. ROWLETT QUARRY & ASPHALT	WHITE OAK BAYOU, ARKANSAS R	11110207	3C
AR0047236	B & M MHP	TRIB/CROOKED&FOURCHE CRS	11110207	3C
AR0047261	KRESTWOOD ESTATES SUBDIVISION	TRIB, LITTLE FOURCHE CR/ARKANSAS R-RB	11110207	3C

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0047449	PCSSD-SCOTT SCHOOL TRT SYSTEM	ASHLEY BAYOU/HORSESHOE/SCOTT BAYOU	11110207	3C
AR0047848	SAFETY-KLEEN SYSTEMS, INC	DITCH,WILLOW SPRINGS BRANCH,LTITTLE FOURCHE CR	11110207	3C
AR0047929	CENTRAL ARKANSAS WATER-OZARK P	DITCH,ARKANSAS R	11110207	3C
AR0047937	CENTRAL ARKANSAS WATER-JACK H.	TRIB,GRASSYFLAT,ROCK,FOURCHE CRS	11110207	3C
AR0048399	MAPLE CREEK FARMS TRACT C H	TRIB, MAPLE CR, PENNINGTON BAYOU	11110207	3C
AR0048542	N LITTLE ROCK ELECTRIC-MURRAY	ARKANSAS R	11110207	3C
AR0048968	CEDAR HEIGHTS BAPTIST CHURCH	WHITE OAK BAYOU TRIB	11110207	3C
AR0049042	OWEN CREEK WASTEWATER PLANT	OWEN CR,FOURCHE CR,ARKANSAS R	11110207	3C
AR0049051	HUMANE SOCIETY OF PULASKI CO	TRIB, MCHENRY CR, FOURCHE CR	11110207	3C
AR0049131	PARKER SOLVENTS COMPANY	WESSON POND, FOURCHE CR	11110207	3C
AR0049255	KINDER MORGAN POWER CO-WRIGHTS	(1) TRIB,LORANCE CR; (2) ARKANSAS R	11110207	3C

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	9.14	4.30	14.85	2.34
BOD_5 (mg/L)	57	1.4	0.22	4.07	0.91
pH (standard units)	57	7.61	6.64	8.62	0.48
Total Organic Carbon (mg/L)	54	4.94	3.472	6.70	0.71
Ammonia as N (mg/L)	60	0.03	<0.005	0.09	0.03
NO_2+NO_3 as N (mg/L)	59	0.35	<0.01	0.77	0.25
Orthophosphate as P (mg/L)	60	0.06	0.009	0.20	0.04
Total phosphorus as P (mg/L)	53	0.13	0.029	0.83	0.11
Total hardness (mg/L)	30	126.36	44	186.00	34.14
Chloride (mg/L)	57	81.83	10.12	221.00	43.06
Sulfate (mg/L)	59	52.37	12.72	96.10	17.99
Total dissolved solids (mg/L)	46	293.63	98.5	431.50	86.06
Total suspended solids (mg/L)	46	15.06	<1.0	89.00	18.10
Turbidity (NTU)	60	21.14	1.9	180.00	25.40

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)	56	9.24	5.31	14.10	2.07
BOD_5 (mg/L)	55	1.33	0.17	3.06	0.65
pH (standard units)	55	7.64	6.65	8.69	0.47
Total Organic Carbon (mg/L)	52	5.07	3.496	7.01	0.77
Ammonia as N (mg/L)	58	0.06	<0.005	0.21	0.04
NO_2+NO_3 as N (mg/L)	57	0.38	<0.01	0.83	0.25
Orthophosphate as P (mg/L)	58	0.07	0.018	0.24	0.04
Total phosphorus as P (mg/L)	52	0.15	0.02	0.93	0.13
Total hardness (mg/L)	29	126.13	45	178.00	34.19
Chloride (mg/L)	55	82.26	10.02	201.00	43.01
Sulfate (mg/L)	57	52.85	13.4	115.00	18.80
Total dissolved solids (mg/L)	45	298.29	104	416.00	81.32
Total suspended solids (mg/L)	45	18.81	1	121.00	21.85
Turbidity (NTU)	58	23.98	2.4	190.00	26.64

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	9.09	6.40	13.70	1.96
BOD_5 (mg/L)	54	1.53	0.38	3.82	0.84
pH (standard units)	53	7.7	6.55	8.59	0.42
Total Organic Carbon (mg/L)	52	5.2	3.446	8.68	0.86
Ammonia as N (mg/L)	56	0.04	<0.005	0.45	0.07
NO_2+NO_3 as N (mg/L)	57	0.35	<0.01	0.94	0.26
Orthophosphate as P (mg/L)	56	0.11	0.005	1.42	0.19
Total phosphorus as P (mg/L)	52	0.13	0.05	0.29	0.06
Total hardness (mg/L)	28	123.04	45	182.00	32.70
Chloride (mg/L)	56	80.44	13.66	205.00	38.78
Sulfate (mg/L)	57	52.45	13.77	98.00	19.64
Total dissolved solids (mg/L)	46	300.07	114.5	438.00	85.47
Total suspended solids (mg/L)	46	19.22	1.5	192.50	31.63
Turbidity (NTU)	56	21.58	2.5	210.00	30.70

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	8.98	5.70	14.40	1.90
BOD_5 (mg/L)	54	1.71	0.35	6.23	1.01
pH (standard units)	53	7.71	6.58	8.75	0.44
Total Organic Carbon (mg/L)	52	5.09	3.9	7.40	0.81
Ammonia as N (mg/L)	56	0.05	<0.005	0.45	0.09
NO_2+NO_3 as N (mg/L)	57	0.35	<0.01	0.91	0.25
Orthophosphate as P (mg/L)	56	0.08	0.012	0.32	0.06
Total phosphorus as P (mg/L)	52	0.12	0.039	0.31	0.06
Total hardness (mg/L)	29	125.34	45	184.00	32.60
Chloride (mg/L)	56	78.37	14.01	221.00	39.11
Sulfate (mg/L)	57	51.74	14.3	100.00	19.68
Total dissolved solids (mg/L)	47	292.44	113.5	444.00	89.04
Total suspended solids (mg/L)	47	16.92	2.5	177.00	26.61
Turbidity (NTU)	56	21.33	2.9	210.00	29.85

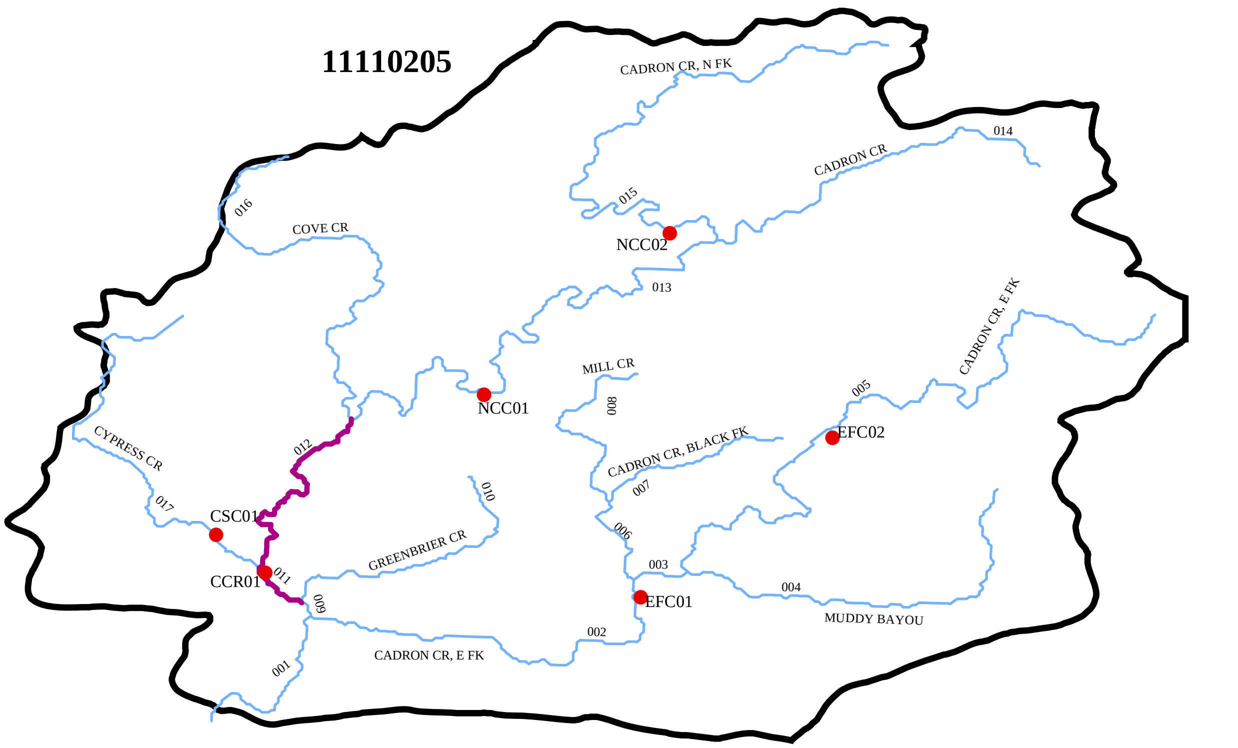
SEGMENT 3D ARKANSAS RIVER AND TRIBUTARIES: LOCK & DAM #7 TO MORRILTON

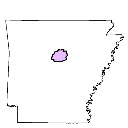
Segment 3D, located in upper central Arkansas, covers most of Conway County as well as parts of Cleburne, Van Buren, Faulkner, and Prarie Counties. The principal waters include the Cadron Creek basin.

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 221.6 stream miles, of which 119.8 stream miles were monitored. An additional 43.5 miles of stream were evaluated bringing the total miles of assessed stream miles in this segment to 163.3. All waters assessed in this segment were supporting all designated uses.

Figure A-31: Planning Segment 3D – Monitoring Stations



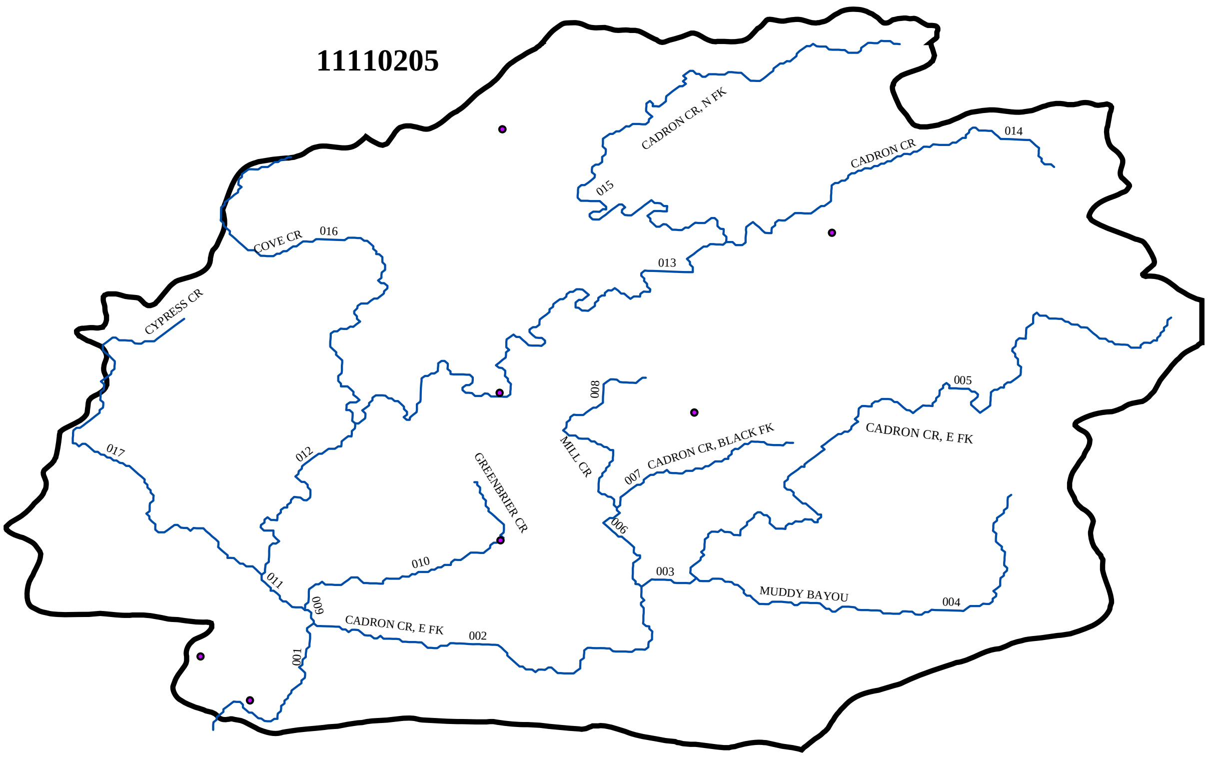


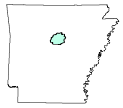
(Segment 3D)

Table A-93: Planning Segment 3D—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-3D																										
Cadron Creek	11110205	-001	7.7		E	S	S	S	S	S	S									1				FISH CONSUMPTION	163.3	0
E. Fork Cadron	11110205	-002	15.6	EFC01	M	S	S	S	S	S	S									1				AQUATIC LIFE	151.6	11.7
E. Fork Cadron	11110205	-003	2		E	S	S	S	S	S	S									1				PRIMARY CONTACT	163.3	0
E. Fork Cadron	11110205	-005	30.7	EFC02	M	S	S	S	S	S	S									1				SECONDARY CONTACT	163.3	0
Muddy Bayou	11110205	-004	15.7		U															3				DRINKING SUPPLY	163.3	0
Black Fork	11110205	-006	4.3		U															3				AGRI & INDUSTRY	163.3	0
Black Fork	11110205	-007	7.2		U															3						
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	CCR01	M	S	N	S	S	S	S	UN				SI				5a						
Cadron Creek	11110205	-012	9.5		E	S	N	S	S	S	S	UN				SI				5a						
Cadron Creek	11110205	-013	26.8	NCC01	M	S	S	S	S	S	S									1						
Cadron Creek	11110205	-014	14.7		E	S	S	S	S	S	S									1						
Greenbriar Cr.	11110205	-010	11.1		U															3						
North Cadron	11110205	-015	26.5	NCC02	M	S	S	S	S	S	S									1						
Cove Creek	11110205	-016	20		U															3						
Cypress Creek	11110205	-017	18	CSC01	M	S	S	S	S	S	S									1						
TOTAL MILES	221.6																									
MILES UNASSESSED	58.3																									
MILES EVALUATED	43.5																									
MILES MONITORED	119.8																									

Figure A-32: Planning Segment 3D – NPDES Permitted Facilities





(Segment 3D)

Table A-94: Segment 3D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0036536	GREENBRIER, CITY OF	GREENBRIER CR,CADRON CR,ARKANSAS R	11110205	3D
AR0037087	AR PARKS & TOURISM-WOOLY HOLLOW	BLACK FORK CR,EAST FORK CADRON CR	11110205	3D
AR0040321	QUITMAN, CITY OF	MILL CR/CADRON CR/ ARKANSAS R	11110205	3D
AR0047112	ROGERS GROUP, INC-GREENBRIER Q	CADRON CR,ARKANSAS R	11110205	3D
AR0047457	CADRON CREEK CATFISH HOUSE	WARD CR TRIB/PINE MOUNTAIN CR/COVE CR	11110205	3D
AR0048119	INTERNATIONAL PAPER CO-CADRON	CADRON CR	11110205	3D
AR0048879	SHILOH CREEK ESTATES	TRIB,GOLD CR,LAKE CONWAY	11110205	3D

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)	17	7.77	1.2	13.6	3.57
BOD_5 (mg/L)	16	1.05	0.07	3.32	1.07
pH (standard units)	15	6.78	5.57	7.49	0.44
Total Organic Carbon (mg/L)	16	3.22	1.5	8.1	1.73
Ammonia as N (mg/L)	18	0.01	<0.005	0.06	0.02
NO_2+NO_3 as N (mg/L)	18	0.22	<0.01	0.55	0.18
Orthophosphate as P (mg/L)	18	0.007	<0.005	0.015	0.004
Total phosphorus as P (mg/L)	17	0.06	0.01	0.34	0.08
Total hardness (mg/L)	17	12	7	31	5.75
Chloride (mg/L)	18	2.7	0.57	3.69	0.65
Sulfate (mg/L)	18	2.85	0.82	4.37	0.93
Total dissolved solids (mg/L)	18	36.05	23	51	8.28
Total suspended solids (mg/L)	18	3.5	<1	20	4.64
Turbidity (NTU)	17	8.17	2.9	26	6.68

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	16	9.16	6.00	14.30	2.50
BOD_5 (mg/L)	16	0.58	0.22	1.05	0.25
pH (standard units)	15	6.95	5.9	7.51	0.43
Total Organic Carbon (mg/L)	16	2.87	1.57	4.6	0.96
Ammonia as N (mg/L)	18	0.007	<0.005	0.04	0.01
NO_2+NO_3 as N (mg/L)	18	0.36	0.04	1.07	0.28
Orthophosphate as P (mg/L)	18	0.007	<0.005	0.026	0.006
Total phosphorus as P (mg/L)	17	0.07	0.01	0.52	0.12
Total hardness (mg/L)	17	18.76	9	61	14.95
Chloride (mg/L)	18	4.83	2.25	29.3	6.14
Sulfate (mg/L)	18	9.75	3.22	47.8	12.95
Total dissolved solids (mg/L)	18	45.61	29	123.5	23.28
Total suspended solids (mg/L)	18	2.36	<1	11	2.77
Turbidity (NTU)	17	4.45	1.2	19.50	4.32

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)	15	9.26	3.60	17.00	3.58
BOD_5 (mg/L)	12	0.98	0.4	1.92	0.52
pH (standard units)	14	7.04	6.11	8.05	0.50
Total Organic Carbon (mg/L)	16	3.58	1.62	6.76	1.34
Ammonia as N (mg/L)	17	0.04	<0.005	0.23	0.06
NO_2+NO_3 as N (mg/L)	17	0.74	0.026	1.55	0.45
Orthophosphate as P (mg/L)	17	0.02	<0.005	0.082	0.019
Total phosphorus as P (mg/L)	16	0.1	<0.002	0.63	0.15
Total hardness (mg/L)	16	15.81	9.00	33.00	6.01
Chloride (mg/L)	17	4.42	3.00	7.07	1.18
Sulfate (mg/L)	17	3.24	1.66	5.00	0.97
Total dissolved solids (mg/L)	16	45.97	32	71	12.00
Total suspended solids (mg/L)	16	2.89	<1	12	2.88
Turbidity (NTU)	16	6.22	1	23.9	5.88

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)	16	7.30	2.6	13.9	3.31
BOD_5 (mg/L)	16	1.76	0.31	6.80	1.62
pH (standard units)	15	6.63	5.89	7.47	0.42
Total Organic Carbon (mg/L)	17	3.98	1.78	8.8	1.85
Ammonia as N (mg/L)	18	0.04	<0.005	0.17	0.05
NO_2+NO_3 as N (mg/L)	18	0.38	<0.01	0.98	0.34
Orthophosphate as P (mg/L)	18	0.01	<0.005	0.025	0.006
Total phosphorus as P (mg/L)	17	0.14	0.06	1.15	0.26
Total hardness (mg/L)	17	16.88	9	34.00	6.36
Chloride (mg/L)	18	4.58	2.77	7.06	1.33
Sulfate (mg/L)	18	4.15	2.19	10.8	1.77
Total dissolved solids (mg/L)	18	47.39	27	81	13.92
Total suspended solids (mg/L)	18	12.36	<1	47.5	10.81
Turbidity (NTU)	17	17.56	5.71	58.70	15.24

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SEGMENT 3E FOURCHE LAFAVE RIVER

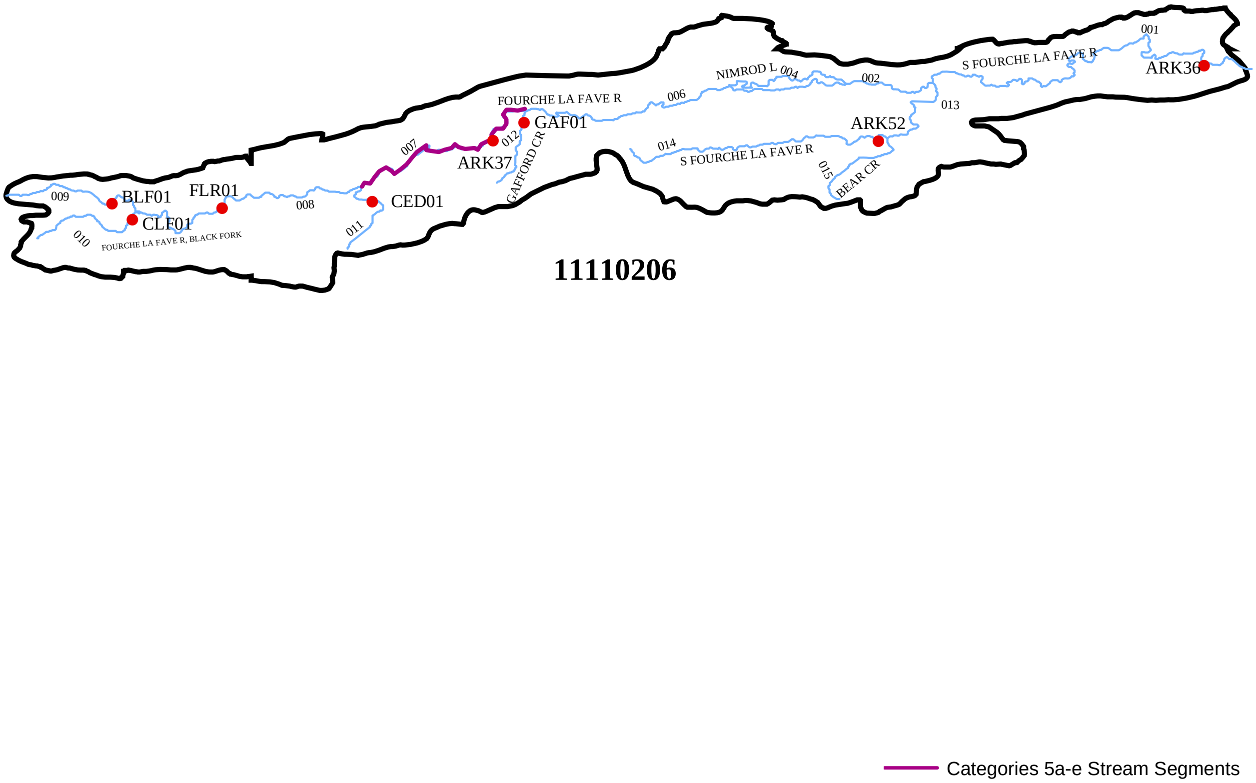
Segment 3E, located in west central Arkansas, includes portions of Perry, Yell, and Scott Counties. This segment contains a 148-mile reach of the Fourche LaFave River and its tributary streams, which include Big Cedar Creek, Mill Creek, Gafford Creek, and South Fourche LaFave River. Major impoundments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

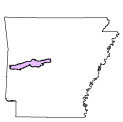
Summary of Water Quality Conditions

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. All 211.5 stream miles in this segment were assessed. Both monthly and quarterly sampled stations were used to monitor 125.1 miles of stream. The remaining 86.4 miles were evaluated. Previous data has shown occasional periods of elevated turbidity values which was associated with agriculture and silviculture activities since these are two of the main land uses within the watershed. However, the construction and maintenance of an abundance of dirt and gravel roads for timber access and general transportation is likely to be a contributing factor. The most recent data indicates all designated uses are being supported in these waters.

A statewide sampling effort has determined that some fishes from Lake Nimrod and the Fourche LaFave River below Nimrod Dam have elevated concentrations of mercury. A TMDL addressing this problem was completed in October 2002.

Figure A-33: Planning Segment 3E – Monitoring Stations



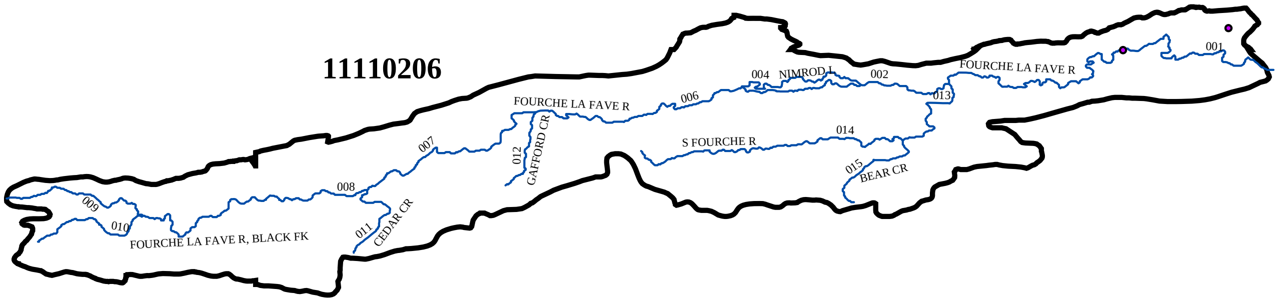


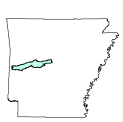
(Segment 3E)

Table A-99: Planning Segment 3E—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-3E																										
Fourche LaFave	11110206	-001	44.4		E	S	S	S	S	S	S									1				FISH CONSUMPTION	202.8	8.7
Fourche LaFave	11110206	-002	8.7		M	N	S	S	S	S	S	UN				HG				4a				AQUATIC LIFE	191.3	20.2
Fourche LaFave	11110206	-006	21.5		E	S	S	S	S	S	S									1				PRIMARY CONTACT	211.5	0
Fourche LaFave	11110206	-007	20.2	ARK37	M	S	N	S	S	S	S	UN				Temp				5e				SECONDARY CONTACT	211.5	0
Fourche LaFave	11110206	-008	25.7	FLR01	M	S	S	S	S	S	S									1				DRINKING SUPPLY	211.5	0
Black Fork	11110206	-009	14.3	BLF01	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	211.5	0
Clear Fork	11110206	-010	12	CLF01	M	S	S	S	S	S	S									1						
Cedar Creek	11110206	-011	9.6	CED01	M	S	S	S	S	S	S									1						
Gafford Creek	11110206	-012	8.5	GAF01	M	S	S	S	S	S	S									1						
S.FourcheLaFave	11110206	-013	10.3		E	S	S	S	S	S	S									1						
S.FourcheLaFave	11110206	-014	26.1	ARK52	M	S	S	S	S	S	S									1						
Bear Creek	11110206	-015	10.2		E	S	S	S	S	S	S									1						
TOTAL MILES	211.5																									
MILES UNASSESSED	0																									
MILES EVALUATED	86.4																									
MILES MONITORED	125.1																									

Figure A-34: Planning Segment 3E – NPDES Permitted Facilities





(Segment 3E)

Table A-100: Segment 3E Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0020125	PERRYVILLE, CITY OF	FOURCHE LAFAVE R	11110206	3E
AR0046957	ANNE WATSON ELEMENTARY SCHOOL	TRIB/MILL CR/FOURCHE LAFAVE R/ARKANSAS R	11110206	3E

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	29	9.34	5.60	14.30	2.48
BOD_5 (mg/L)	31	0.73	0.00	2.22	0.45
pH (standard units)	32	7.2	6.00	8.21	0.42
Total Organic Carbon (mg/L)	29	2.62	1.41	4.53	0.88
Ammonia as N (mg/L)	31	0.05	<0.005	1.35	0.24
NO_2+NO_3 as N (mg/L)	30	0.15	<0.01	1.05	0.21
Orthophosphate as P (mg/L)	31	0.01	<0.005	0.09	0.02
Total phosphorus as P (mg/L)	30	0.04	0.01	0.18	0.04
Total hardness (mg/L)	14	11.14	8	15.00	2.32
Chloride (mg/L)	32	2.71	2.06	3.41	0.39
Sulfate (mg/L)	32	3.84	2.37	5.32	0.61
Total dissolved solids (mg/L)	18	36.42	29.5	46.00	5.03
Total suspended solids (mg/L)	17	4.85	<1.0	39.50	9.04
Turbidity (NTU)	31	12.89	3.6	50.00	12.26

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

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	8.41	4.80	12.94	1.95
BOD_5 (mg/L)	55	1.07	0.00	2.83	0.58
pH (standard units)	57	6.63	5.69	8.28	0.41
Total Organic Carbon (mg/L)	58	5.71	3.03	11.80	2.04
Ammonia as N (mg/L)	59	0.01	<0.005	0.16	0.03
NO_2+NO_3 as N (mg/L)	59	0.13	<0.01	0.46	0.11
Orthophosphate as P (mg/L)	59	0.01	<0.005	0.02	0.01
Total phosphorus as P (mg/L)	58	0.03	0.01	0.10	0.02
Total hardness (mg/L)	29	11.41	8	18.00	2.23
Chloride (mg/L)	60	3.07	1.51	5.34	0.64
Sulfate (mg/L)	60	3.91	2.05	10.40	1.27
Total dissolved solids (mg/L)	48	39.8	29	54.00	5.39
Total suspended solids (mg/L)	48	4.33	<1.0	23.50	5.62
Turbidity (NTU)	58	12.7	1.6	132.00	18.09

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.

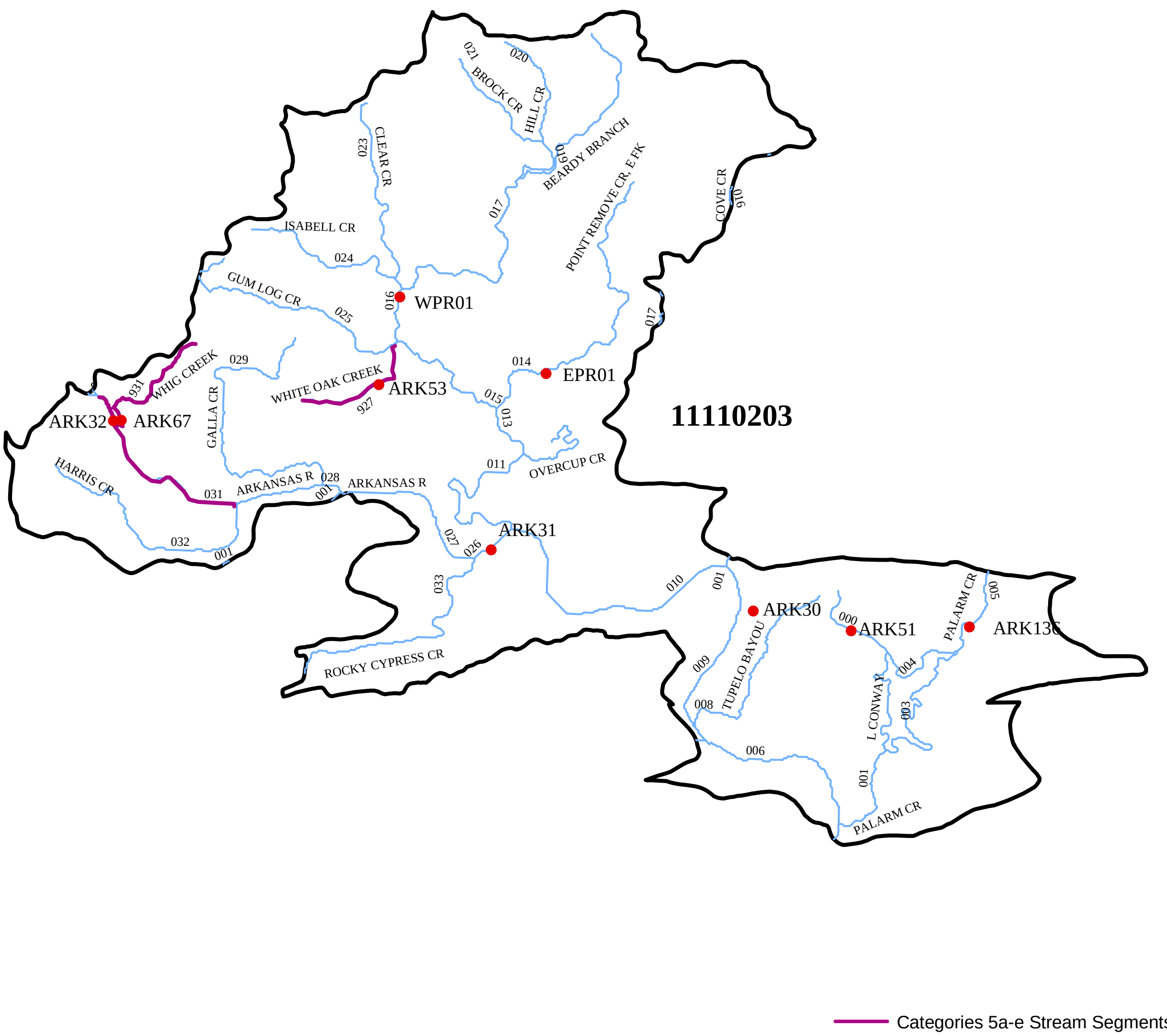
Summary of Water Quality Conditions

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. Nine monitoring stations within this segment allow assessment of 78.4 streams miles with an additional 58.9 miles of stream being evaluated. The remaining stream segments were unassessed.

Whig Creek continues to be impaired by point source discharges. Both municipal and industrial discharges exist in Whig Creek. A TMDL has been completed for this waterbody. A municipal and industrial discharge also existed in White Oak Creek, however both were supposedly eliminated although evidence of continued discharges exist. High turbidity, probably from nonpoint sources, appears to be the major problem. Stone Dam Creek was also impaired by a municipal discharge with chronically toxic ammonia levels and nitrates exceeding the drinking water maximum contaminant level.

An approximate 2 mile segment of the Arkansas River below Dardanelle Reservoir occasionally had D.O. 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 (see figure on page A-150).

Figure A-35: Planning Segment 3F – Monitoring Stations



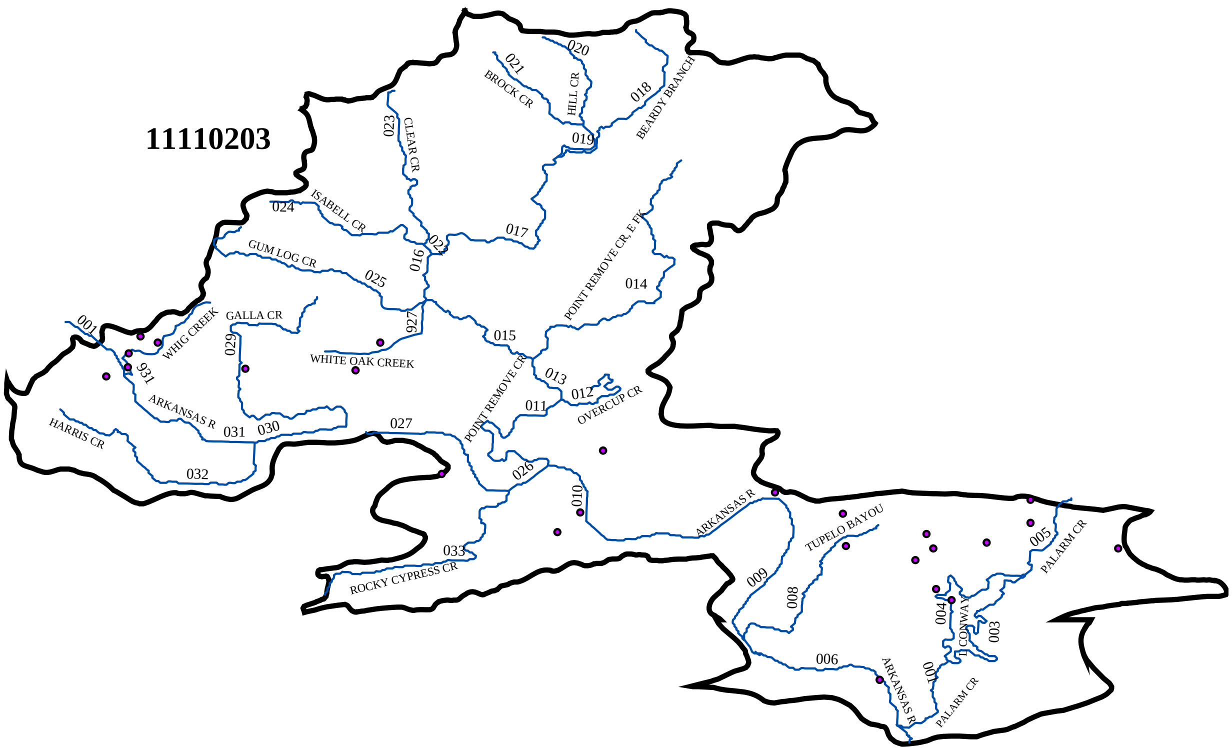
(Segment 3F)

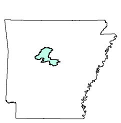
Table A-103: Planning Segment 3F—Designated Use Attainment Status

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-3F																							
Palarm Creek	11110203	-001	6.4		U															3			
Stone Dam Creek	11110203	-904	3	ARK51	M	S	N	S	S	N	S	MP	MP			AM	NO3			4a	4a		
Palarm Creek	11110203	-005	6.6	ARK136	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		E	S	S	S	S	S	S									1			
Tupelo Bayou	11110203	-008	13		U															3			
Arkansas River	11110203	-009	10.6	ARK30	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	EPR01	M	S	S	S	S	S	S									1			
West Pt.Remove	11110203	-015	8.2		U															3			
West Pt.Remove	11110203	-016	3.3	WPR01	M	S	S	S	S	S	S									1			
West Pt.Remove	11110203	-017	14.4		E	S	S	S	S	S	S									1			
West Pt.Remove	11110203	-019	4.1		U															3			
Beardy Branch	11110203	-018	12.9		U															3			
Hill Creek	11110203	-020	7.3		U															3			
Brock Creek	11110203	-021	7.4		U															3			
Clear Creek	11110203	-022	0.7		U															3			
Clear Creek	11110203	-023	11.7		U															3			
Isabel Creek	11110203	-024	10.5		U															3			
Gum Log Creek	11110203	-025	15.8		U															3			
Arkansas River	11110203	-026	2.6	ARK31	M	S	S	S	S	S	S									1			
Arkansas River	11110203	-027	9.9		E	S	S	S	S	S	S									1			
Arkansas River	11110203	-028	1.2		E	S	S	S	S	S	S									1			
Galla Creek	11110203	-029	20.1		U															3			
Arkansas River	11110203	-030	5.1		E	S	S	S	S	S	S									1			
Arkansas River	11110203	-031U	2.0		M	S	N	S	S	S	S	HP				DO				5a			
Arkansas River	11110203	-031L	9.4	ARK32	M	S	S	S	S	N	S	UN				TDS				5a			
Harris Creek	11110203	-032	15.6		U															3			
Rocky Cypress	11110203	-033	15.7		U															3			
Whig Creek	11110203	-931	10	ARK67	M	S	N	S	S	N	S	MP	MP			NU	ME			4a	4a		
White Oak Creek	11110203	-927	10	ARK53	M	S	N	S	S	S	S	UN				SI				5a			
TOTAL MILES	310.8																						
MILES UNASSESSED	173.5																						
MILES EVALUATED	58.9																						
MILES MONITORED	78.4																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	137.3	0
AQUATIC LIFE	112.3	25
PRIMARY CONTACT	137.3	0
SECONDARY CONTACT	137.3	0
DRINKING SUPPLY	114.9	22.4
AGRI & INDUSTRY	137.3	0

Figure A-36: Planning Segment 3F – NPDES Permitted Facilities





(Segment 3F)

Table A-104: Segment 3F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0001830	GREEN BAY PACKAGING-AR KRAFT	SLOUGH-ARKANSAS R	11110203	3F
AR0021768	RUSSELLVILLE CITY CORP	WHIG CR,ARKANSAS R	11110203	3F
AR0033359	CONWAY, CITY OF-STONE DAM CR	STONE DAM CR,LAKE CONWAY	11110203	3F
AR0033421	DARDANELLE, CITY OF	ARKANSAS R	11110203	3F
AR0034665	ATKINS, CITY OF-NORTH WWTF	ARKANSAS R	11110203	3F
AR0034673	ATKINS, CITY OF-SOUTH WWTP	HORSE PEN CR,GALLA CR,AR R	11110203	3F
AR0036714	TYSON FOODS INC-DARDANELLE	ARKANSAS R	11110203	3F
AR0037206	MAYFLOWER, CITY OF	ARKANSAS R	11110203	3F
AR0039454	GOLD CREEK LANDING-CONWAY	LAKE CONWAY,ARKANSAS R	11110203	3F
AR0041301	GOLDEN MEADOWS POA-CONWAY	TRIB,TUCKER CR,TUPELO BAYOU,ARKANSAS R	11110203	3F
AR0042536	ROLLING CREEK POA	WARREN CR TRIB,PALARM CR,LAKE CONWAY	11110203	3F
AR0042668	GRACE MANUFACTURING, INC	ARKANSAS R	11110203	3F
AR0043028	PIONEER SOUTHERN, INC	TRIB/TANK LAKE	11110203	3F
AR0043214	ROGERS GROUP, INC-CONWAY ASPHALT	TRIB/STONE DAM CR/LAKE CONWAY/ARKANSAS RB	11110203	3F
AR0044474	FREEMAN BROTHERS, INC	TRIB,WHIG CR	11110203	3F
AR0044717	CAMP MITCHELL CONFERENCE CTR	TRIB,FLAT CYPRESS CR,CYPRESS CR	11110203	3F
AR0044997	BHT INVESTMENT-EXXON FOOD MART	TRIB/WARREN-PALARM CRS/LAKE CONWAY/ARKANSAS	11110203	3F
AR0045071	WILLIAMS EXPRESS #3059	TRIB,STONE DAM CR,LAKE CONWAY	11110203	3F
AR0047104	ROGERS GROUP, INC-TOADSUCR QUARRY	SLOUGH, ARKANSAS R	11110203	3F
AR0047279	CONWAY, CITY OF TUCKER CREEK W	ARKANSAS R	11110203	3F
AR0047520	ROGERS GROUP, INC-BERYL QUARRY	TRIB,PALARM CR,LAKE CONWAY	11110203	3F
AR0047643	OPPELO, CITY OF	TRIB,CYPRESS CR,ARKANSAS R	11110203	3F
AR0048011	POTTSVILLE, CITY OF	TRIB,GALLA CR,SWMA RES	11110203	3F

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0048429	DOVER, CITY OF	BAKERS CR,ILLINOIS BAYOU,LAKE DARDANELLE	11110203	3F
AR0048623	GERICORP, INC	CR, OLD RIVER LAKE, MILLER BAYOU, ARKANSAS R	11110203	3F
AR0048682	WILHELMINA COVE POA	GOLD CR,LAKE CONWAY,PALARM CR,ARKANSAS R	11110203	3F

Table A-105: ARK0030 Arkansas River at Lock & Dam #8

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	9.64	5.44	13.52	2.04
BOD_5 (mg/L)	53	1.36	0.42	3.83	0.71
pH (standard units)	55	7.78	6.73	8.68	0.46
Total Organic Carbon (mg/L)	56	4.93	3.21	8.70	1.02
Ammonia as N (mg/L)	57	0.03	<0.005	0.10	0.03
NO_2+NO_3 as N (mg/L)	57	0.38	<0.01	0.99	0.28
Orthophosphate as P (mg/L)	57	0.05	0.01	0.10	0.02
Total phosphorus as P (mg/L)	55	0.1	0.027	0.19	0.03
Total hardness (mg/L)	29	130.07	45	194.00	34.78
Chloride (mg/L)	58	89.13	4.7	354.00	59.48
Sulfate (mg/L)	58	54.53	7.99	99.40	20.60
Total dissolved solids (mg/L)	46	319.67	108	512.00	99.02
Total suspended solids (mg/L)	46	16.25	3	80.50	15.41
Turbidity (NTU)	56	23.1	3	86.80	18.44

Table A-106: ARK0031 Arkansas River at Lock & Dam #9

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	9.29	5.50	13.24	1.99
BOD_5 (mg/L)	52	1.21	0.47	3.26	0.52
pH (standard units)	54	7.68	6.53	8.73	0.52
Total Organic Carbon (mg/L)	55	4.82	2.916	7.50	0.88
Ammonia as N (mg/L)	56	0.03	<0.005	0.11	0.03
NO_2+NO_3 as N (mg/L)	56	0.39	<0.01	0.96	0.26
Orthophosphate as P (mg/L)	56	0.05	0.007	0.11	0.02
Total phosphorus as P (mg/L)	54	0.11	0.056	0.60	0.07
Total hardness (mg/L)	27	139.52	69	205.00	30.91
Chloride (mg/L)	57	98.09	1.91	421.00	69.89
Sulfate (mg/L)	57	56.79	3.89	100.00	21.20
Total dissolved solids (mg/L)	45	321.96	71	558.50	106.80
Total suspended solids (mg/L)	45	15.93	<1.0	80.80	15.87
Turbidity (NTU)	55	22.6	3.1	84.80	19.10

Table A-107: ARK0032 Arkansas River Near Dardanelle, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.76	3.20	14.80	2.44
BOD_5 (mg/L)	56	1.35	0.46	6.68	0.91
pH (standard units)	58	7.69	6.56	8.98	0.42
Total Organic Carbon (mg/L)	59	4.77	2.893	7.00	0.85
Ammonia as N (mg/L)	60	0.04	<0.005	0.12	0.03
NO_2+NO_3 as N (mg/L)	60	0.38	0.028	1.00	0.25
Orthophosphate as P (mg/L)	60	0.06	0.005	0.19	0.03
Total phosphorus as P (mg/L)	58	0.13	0.054	0.29	0.05
Total hardness (mg/L)	29	140.9	80	202.00	30.29
Chloride (mg/L)	61	99.2	24.78	399.00	66.90
Sulfate (mg/L)	61	59.71	21	110.00	20.13
Total dissolved solids (mg/L)	49	339.41	135	611.00	103.15
Total suspended solids (mg/L)	49	20.2	3	118.30	21.45
Turbidity (NTU)	59	25.23	4.2	87.40	19.89

Table A-108: ARK0051 Stone Dam Creek Downstream of Conway, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	7.15	2.80	12.91	2.00
BOD_5 (mg/L)	56	4.56	0.72	8.60	2.20
pH (standard units)	57	6.79	6.17	7.86	0.29
Total Organic Carbon (mg/L)	59	8.43	1.6	15.50	2.13
Ammonia as N (mg/L)	60	3.72	<0.005	12.98	3.76
NO_2+NO_3 as N (mg/L)	60	5.42	0.673	13.66	3.57
Orthophosphate as P (mg/L)	60	1.59	0.185	3.71	0.74
Total phosphorus as P (mg/L)	58	1.73	0.27	3.18	0.68
Total hardness (mg/L)	30	72.23	40	104.00	17.75
Chloride (mg/L)	61	43.06	9.95	65.30	12.99
Sulfate (mg/L)	60	123.59	<0.04	247.48	48.23
Total dissolved solids (mg/L)	48	363.61	116.5	606.00	100.56
Total suspended solids (mg/L)	49	15.32	4	50.50	9.48
Turbidity (NTU)	59	17.48	3.6	86.40	16.61

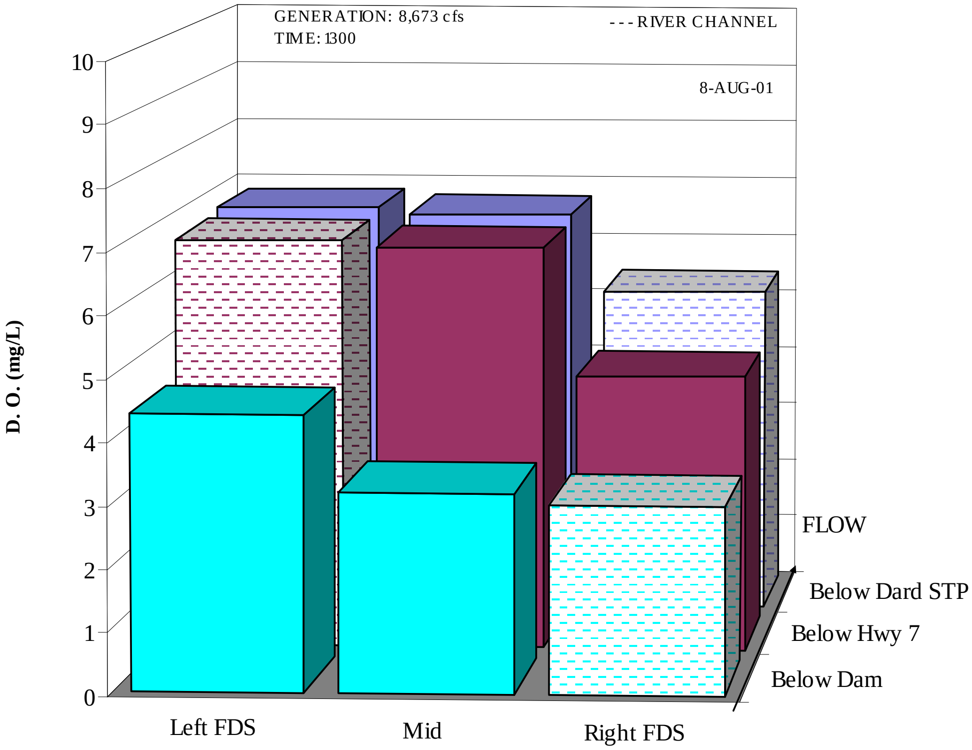
Table A-109: ARK0053 White Oak Creek Near Atkins, AR

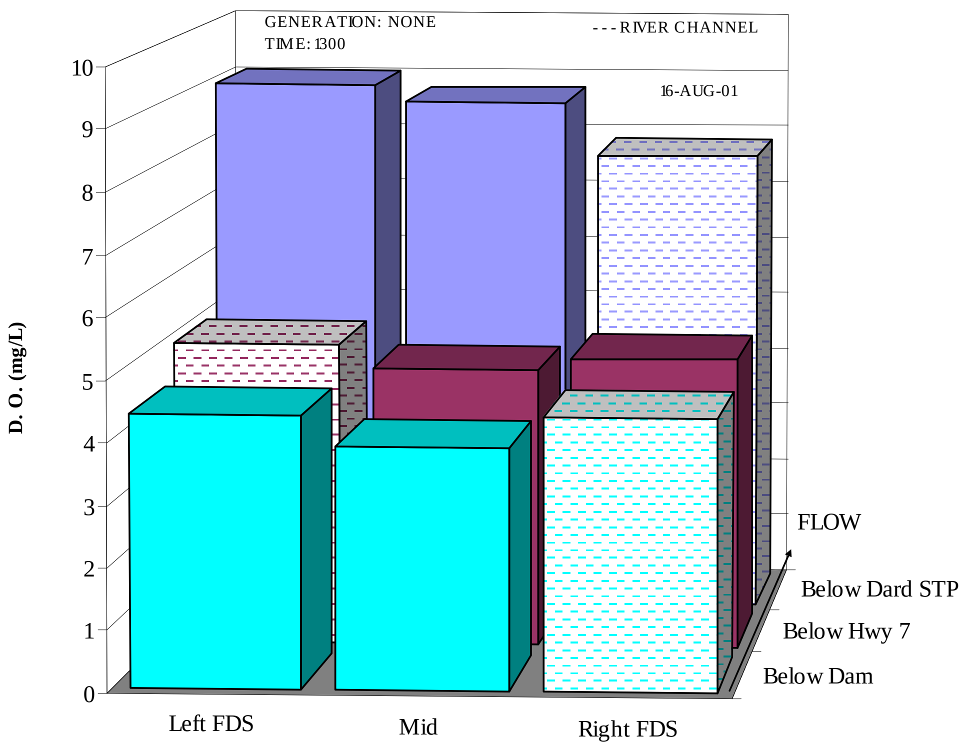
Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	8.66	0.70	16.76	3.11
BOD_5 (mg/L)	53	3.83	0.34	66.70	9.68
pH (standard units)	56	7.02	6.02	8.65	0.54
Total Organic Carbon (mg/L)	56	11.92	3.66	169.00	26.68
Ammonia as N (mg/L)	57	0.21	<0.005	7.20	1.02
NO_2+NO_3 as N (mg/L)	57	0.23	<0.01	1.35	0.30
Orthophosphate as P (mg/L)	57	0.02	<0.005	0.16	0.03
Total phosphorus as P (mg/L)	56	0.1	0.01	0.33	0.06
Total hardness (mg/L)	27	54.15	21	214.00	40.29
Chloride (mg/L)	58	123.44	4.08	1890.00	335.39
Sulfate (mg/L)	58	18	3.18	48.60	7.50
Total dissolved solids (mg/L)	47	356.91	68	3531.50	703.90
Total suspended solids (mg/L)	47	10.91	1.8	32.50	8.02
Turbidity (NTU)	56	27.25	3.6	128.00	23.37

Table A-110: ARK0067 Whig Creek Downstream of Russellville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	7.81	4.00	12.60	1.93
BOD_5 (mg/L)	55	1.37	0.29	5.60	1.03
pH (standard units)	57	7.06	6.35	7.68	0.30
Total Organic Carbon (mg/L)	58	6.33	4.059	10.40	1.07
Ammonia as N (mg/L)	59	0.16	<0.005	1.69	0.27
NO_2+NO_3 as N (mg/L)	59	8.51	0.168	23.90	4.37
Orthophosphate as P (mg/L)	59	3.48	<0.005	8.54	2.27
Total phosphorus as P (mg/L)	58	3.63	0.37	8.23	2.13
Total hardness (mg/L)	29	56.17	17	124.00	19.09
Chloride (mg/L)	60	43.25	2.98	96.40	23.64
Sulfate (mg/L)	60	38.16	11.8	70.90	11.28
Total dissolved solids (mg/L)	47	262.99	35.5	424.50	103.15
Total suspended solids (mg/L)	48	48.9	<1.0	1348.00	206.77
Turbidity (NTU)	58	33.51	2.7	630.00	106.48

Figure A-37: Arkansas River Dissolved Oxygen Sampling, 1 foot Depth Below Dardanelle Lock & Dam, 2001





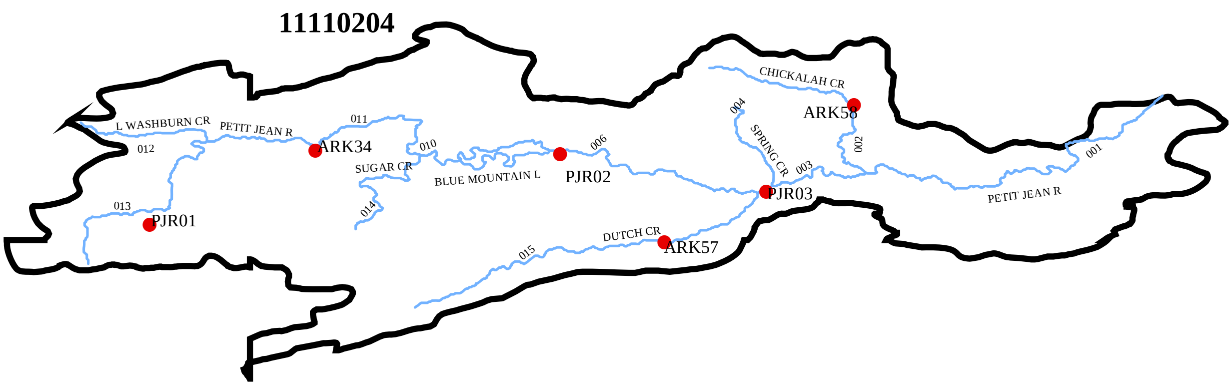
SEGMENT 3G PETIT JEAN RIVER AND TRIBUTARIES

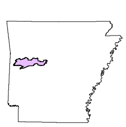
Segment 3G, located in west central Arkansas, includes portions of Yell, Conway, Perry, Logan, Sebastian, and Scott Counties. This segment includes the entire length of the Petit Jean River and its tributary streams. Major tributaries include Dutch Creek, Spring Creek, Chickalah Creek and Rose Creek. 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. None of the waters in this segment were assessed as “not meeting” designated uses.

Figure A-38: Planning Segment 3G – Monitoring Stations



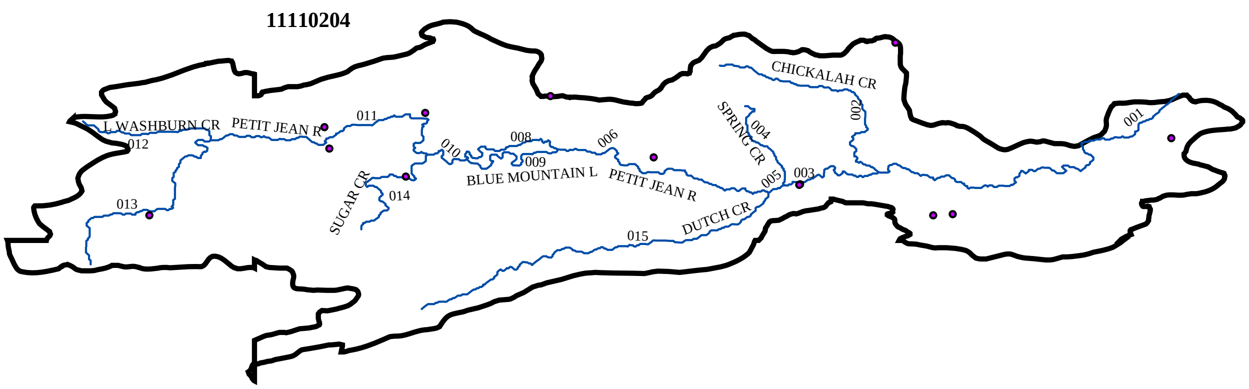


(Segment 3G)

Table A-111: Planning Segment 3G—Designated Use Attainment Status

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-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	116.9	0
Petit Jean R.	11110204	-005	1.3	PJR03	M	S	S	S	S	S	S									1				PRIMARY CONTACT	116.9	0
Petit Jean R.	11110204	-006	17.9	PJR02	M	S	S	S	S	S	S									1				SECONDARY CONTACT	116.9	0
Petit Jean R.	11110204	-007	6		U															3				DRINKING SUPPLY	116.9	0
Petit Jean R.	11110204	-010	4.1		U															3				AGRI & INDUSTRY	116.9	0
Petit Jean R.	11110204	-011	21.6	ARK34	M	S	S	S	S	S	S									1						
Petit Jean R.	11110204	-013	19.2	PJR01	M	S	S	S	S	S	S									1						
Chickalah Cr.	11110204	-002	19.3	ARK58	M	S	S	S	S	S	S									1						
Spring Creek	11110204	-004	18.6		U															3						
L. Washburn Cr.	11110204	-012	10		U															3						
Sugar Creek	11110204	-014	12.8		U															3						
Dutch Creek	11110204	-015	28.9	ARK57	M	S	S	S	S	S	S									1						
TOTAL MILES	198.5																									
MILES UNASSESSED	81.6																									
MILES EVALUATED	8.7																									
MILES MONITORED	108.2																									

Figure A-39: Planning Segment 3G – NPDES Permitted Facilities



(Segment 3G)

Table A-112: Segment 3G Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0021571	BOONEVILLE, CITY OF	TRIB,PETIT JEAN R, ARKANSAS R	11110204	3G
AR0022241	DANVILLE, CITY OF	PETIT JEAN R	11110204	3G
AR0035688	OLA, CITY OF	KEELAND CR,PETIT JEAN R	11110204	3G
AR0037397	MAGAZINE, CITY OF	REVILLE CR TRIB,PETIT JEAN R	11110204	3G
AR0037541	BOONEVILLE HUMAN DEV CTR-ADHS	PETIT JEAN R	11110204	3G
AR0037648	AR PARKS & TOURISM-PETIT JEAN	DITCH,CEDAR CR,PETIT JEAN R,ARKANSAS R	11110204	3G
AR0038768	WAYNE FARMS	PETIT JEAN R	11110204	3G
AR0045799	AR HWY DEPT-WALDRON REST AREA-	TRIB, PETIT JEAN R	11110204	3G
AR0046256	HAVANA, CITY OF	PETIT JEAN R	11110204	3G
AR0046426	AR GAME & FISH COMM-BLUE MOUNTAIN	TRIB/SUGAR CR,PETIT JEAN R,BLUE MOUNTAIN	11110204	3G
AR0048640	DELTIC TIMBER CORP - OLA MILL	KEELAND CR,PETIT JEAN R	11110204	3G
AR0048852	AR PARKS & TOURISM-MT MAGAZINE	WEST BASS CR	11110204	3G

Table A-113: ARK0034 Petit Jean River Near Booneville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	40	8.36	3.57	13.40	2.55
BOD_5 (mg/L)	44	1.27	0.00	2.87	0.65
pH (standard units)	45	7.09	4.00	8.21	0.62
Total Organic Carbon (mg/L)	40	4.33	2.7	7.15	1.12
Ammonia as N (mg/L)	45	0.02	<0.005	0.09	0.02
NO_2+NO_3 as N (mg/L)	44	0.26	<0.01	0.89	0.26
Orthophosphate as P (mg/L)	45	0.02	<0.005	0.10	0.02
Total phosphorus as P (mg/L)	42	0.08	0.028	0.29	0.05
Total hardness (mg/L)	21	22.35	14	36.00	6.41
Chloride (mg/L)	46	5.86	0.42	68.35	9.49
Sulfate (mg/L)	46	8.91	<0.04	42.09	5.84
Total dissolved solids (mg/L)	32	68.19	49	250.00	34.21
Total suspended solids (mg/L)	31	13.36	2.5	66.50	14.85
Turbidity (NTU)	45	21.13	5.7	65.00	13.67

Table A-114: ARK0057 Dutch Creek Downstream of Shark, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	7.74	2.90	12.57	2.54
BOD_5 (mg/L)	55	1.28	0.00	5.11	1.05
pH (standard units)	57	6.69	5.95	7.31	0.27
Total Organic Carbon (mg/L)	58	3.79	1.469	7.60	1.51
Ammonia as N (mg/L)	59	0.09	<0.005	1.20	0.21
NO_2+NO_3 as N (mg/L)	59	0.51	<0.01	3.01	0.50
Orthophosphate as P (mg/L)	59	0.02	<0.005	0.08	0.02
Total phosphorus as P (mg/L)	58	0.08	0.01	0.52	0.08
Total hardness (mg/L)	28	19.79	10	42.00	9.47
Chloride (mg/L)	60	4.39	1.42	9.45	1.48
Sulfate (mg/L)	60	4.02	1.1	5.70	1.30
Total dissolved solids (mg/L)	48	56.1	37	81.00	12.56
Total suspended solids (mg/L)	48	18.86	<1.0	392.50	59.00
Turbidity (NTU)	58	22.2	3.8	192.00	34.99

Table A-115: ARK0058 Chickalah Creek at Chickalah, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	7.93	3.05	12.87	2.68
BOD_5 (mg/L)	56	1.53	0.00	10.16	1.94
pH (standard units)	58	6.7	5.82	8.31	0.34
Total Organic Carbon (mg/L)	59	3.36	1.145	9.00	1.86
Ammonia as N (mg/L)	60	0.08	<0.005	2.45	0.32
NO_2+NO_3 as N (mg/L)	60	0.51	<0.01	2.18	0.47
Orthophosphate as P (mg/L)	60	0.02	<0.005	0.10	0.02
Total phosphorus as P (mg/L)	59	0.07	0.01	0.49	0.08
Total hardness (mg/L)	30	21.47	10	54.00	13.86
Chloride (mg/L)	61	5.31	1.69	14.50	3.28
Sulfate (mg/L)	61	4.16	0.63	10.40	1.74
Total dissolved solids (mg/L)	49	59.68	34	113.50	21.28
Total suspended solids (mg/L)	49	18.62	<1.0	290.00	45.58
Turbidity (NTU)	59	25.48	7	280.00	36.92

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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 Big Piney Creek, Lee Creek, Mulberry River, Six Mile Creek, and Vache Grasse Creek.

Summary of Water Quality Conditions

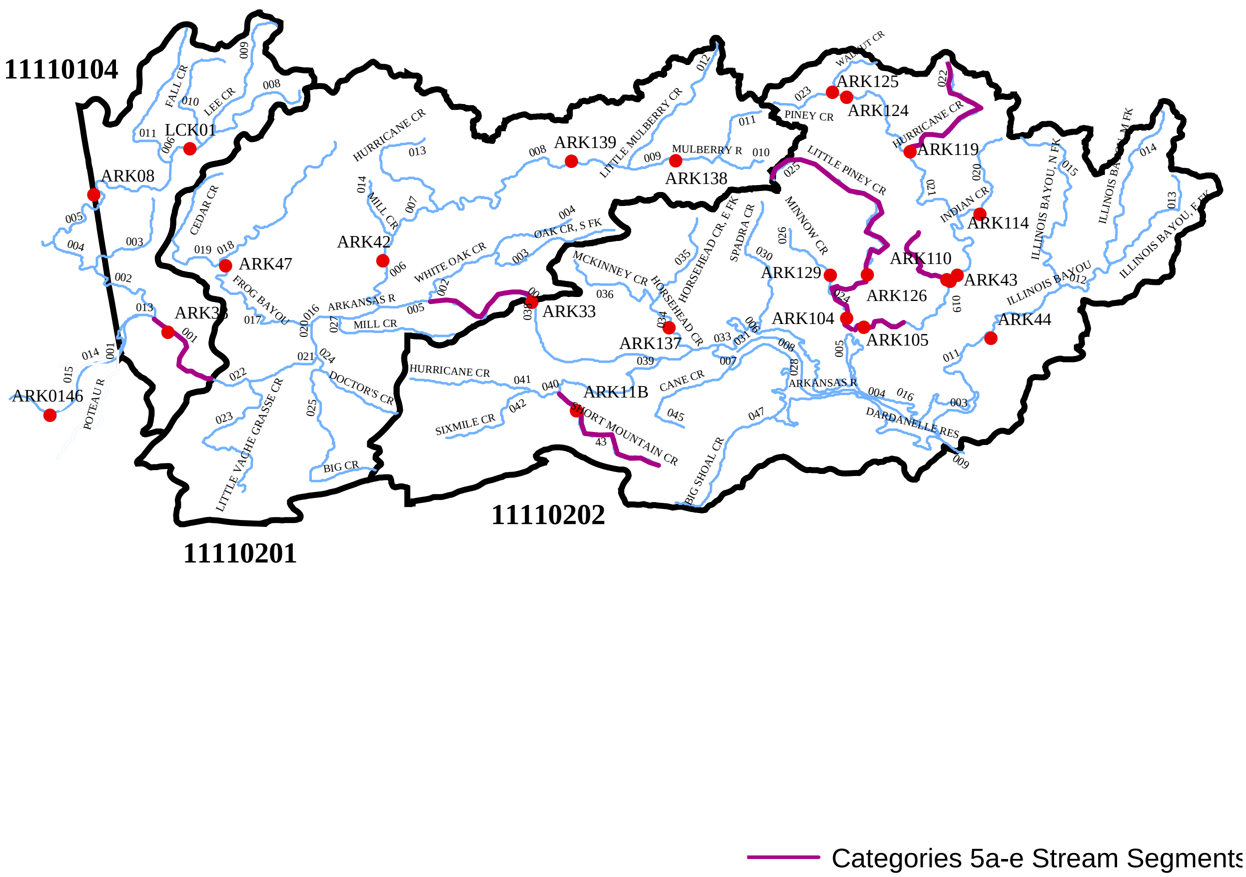
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supply. Thirteen monitoring stations are located within this segment and were utilized to assess 313.1 miles of stream segments. An additional 181.4 stream miles were evaluated; the remainder of stream segments were unassessed.

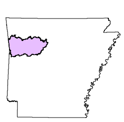
Eleven ambient monitoring stations are located on the Arkansas River from above Ft. Smith to Pendleton (Lock & Dam #2); three of these are in Segment 3H. All of these stations are typically sampled monthly, except during 1998 when only nine samples were collected. Minimum dissolved oxygen values and the number of dissolved oxygen standard violations, < 5 mg/L, are compared for Arkansas River monitoring stations on pages A-169 and A-170. (Toad Suck Lock & Dam, near Conway, and Lock & Dam #2 are not shown since no standard violations occurred at these stations.)

Minimum dissolved oxygen values declined substantially in segment 3H of the Arkansas River from Ft. Smith to Ozark since 1991 and have yet to recover to pre-1991 values although higher minimum values are noted in 1999-2001 (page A-169). A similar, but less pronounced, decline occurred with maximum dissolved oxygen values at Ft. Smith and Ozark. Between 1995 and 1998, 14% of dissolved oxygen values violated the standards at Ft. Smith, 12% of samples violated standards at Ozark and 13% of samples violated standards at Dardanelle (page A-170). At Murray Lock & Dam, Terry Lock & Dam and Lock & Dam #5 the dissolved oxygen standard was violated once per station during this 4-year period. No standard violations occurred from 1995 to 1998 at Morrilton, Toad Suck Lock & Dam, Lock & Dam #4 and Lock & Dam #2.

During the period 1999 through 2001, two D.O. violations were recorded at Ark 32 (below Dardanelle Dam), approximately 5% exceedance; one at Murray Lock and Dam and none at the other Arkansas River stations (see figures on page A-170).

Figure A-40: Planning Segment 3H – Monitoring Stations





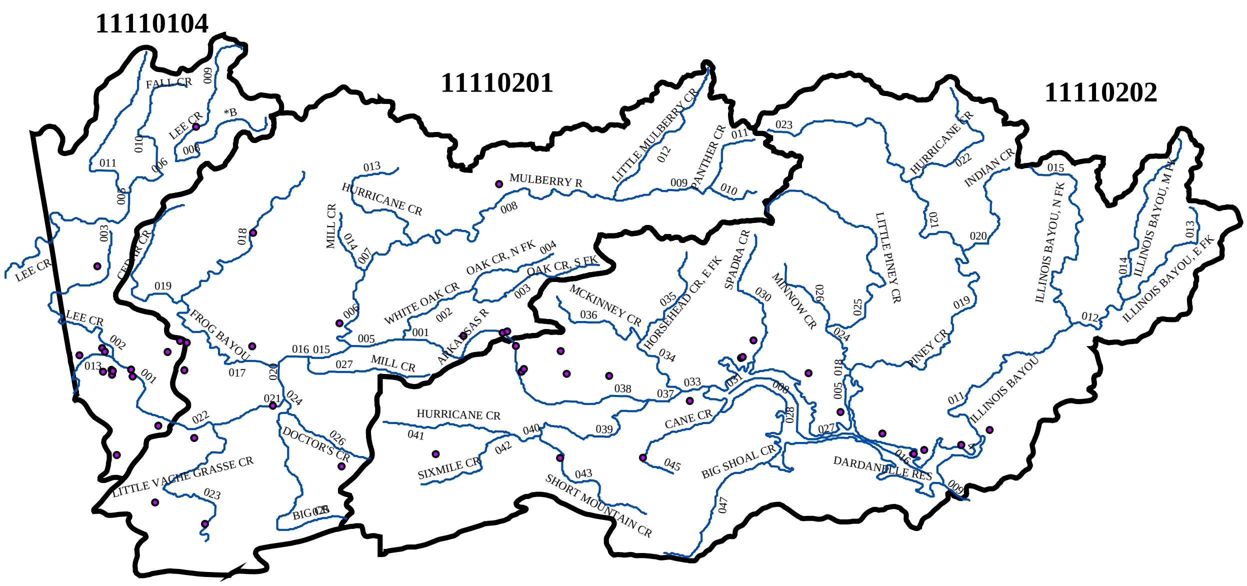
(Segment 3H)

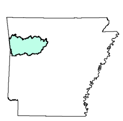
Table A-116: Planning Segment 3H—Designated Use Attainment Status

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-3H																							
Arkansas River	11110202	-001	2.8		E	S	S	S	S	S	S									1			
Illinois Bayou	11110202	-011	21	ARK44	M	S	S	S	S	S	S									1			
Illinois Bayou	11110202	-012	8.1		E	S	S	S	S	S	S									1			
Illinois Bayou	11110202	-013	14.1		E	S	S	S	S	S	S									1			
M.Fk.Ill.Bayou.	11110202	-014	19.8		E	S	S	S	S	S	S									1			
N.Fk.Ill.Bayou.	11110202	-015	24		E	S	S	S	S	S	S									1			
Piney Creek	11110202	-018	5.8	ARK105	M	S	S	N	S	S	S	AG				PA				5d			
Piney Creek	11110202	-019	26.3	ARK43	M	S	S	S	S	S	S												
Mill Creek	11110202	-901	8.6	ARK110	M	S	S	N	S	S	S	AG				PA				5d			
Indian Creek	11110202	-020	12.2	ARK114	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	ARK119	M	S	S	N	S	S	S	UN				PA				5d			
Piney Creek	11110202	-023	19	ARK124	M	S	S	S	S	S	S									1			
Walnut Creek	11110202	-902	5.1	ARK125	M	S	S	N	S	S	S	UN				PA				5d			
Little Piney	11110202	-024	6.2	ARK104	M	S	S	N	S	S	S	AG				PA				5d			
Minnow Creek	11110202	-026	9.5	ARK129	M	S	S	S	S	S	S									1			
Little Piney	11110202	-025	27.2	ARK126	M	S	S	N	S	S	S	UN				PA				5d			
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	ARK137	M	S	S	S	S	S	S									1			
McKinney Cr.	11110202	-036	11.8		U															3			
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		U															3			
Hurricane Creek	11110202	-041	11.6		U															3			
Sixmile Creek	11110202	-042	10.7		U															3			
Short Mountain	11110202	-043	14.9	ARK11B	M	S	N	S	S	S	S	MP				Cu				5d			
Cane Creek	11110202	-045	12.3		U															3			
Big Shoal Cr.	11110202	-047	15.4		U															3			
Arkansas River	11110201	-001	12.4	ARK33	M	S	S	S	S	N	N	UN				TDS				5a			
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		E	S	S	S	S	S	S									1			
Mulberry River	11110201	-006	10.4	ARK42	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	ARK138	M	S	S	S	S	S	S									1			
Mulberry River	11110201	-009	9.1		E	S	S	S	S	S	S									1			
Mulberry River	11110201	-010	5.1		E	S	S	S	S	S	S									1			
Panther Creek	11110201	-011	7.4		U															3			
Little Mulberry	11110201	-012	17.4		M	S	S	S	S	S	S									1			
Hurricane Creek	11110201	-013	14.8		U															3			
Mill Creek	11110201	-014	7		U															3			
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		U															3			
Frog Bayou	11110201	-018	20.4	ARK47	M	S	S	S	S	S	S									1			
Cedar Creek	11110201	-019	17		U															3			
Arkansas River	11110201	-020	3.5		E	S	S	S	S	S	S									1			
Arkansas River	11110201	-021	7		E	S	S	S	S	S	S									1			
Arkansas River	11110201	-022	3		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	ARK38	M	S	S	S	S	N	N	UN				TDS				5a			
Arkansas River	11110104	-013	17	ARK146	M	S	S	S	S	S	S									1			
Lee Creek	11110104	-002	10.5	ARK08	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	LCK01	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		U															3			
Cove Creek	11110104	-010	13.3		U															3			
Mt.Fork Creek	11110104	-011	18.9		U															3			
TOTAL MILES	779																						
MILES UNASSESSED	284.5																						
MILES EVALUATED	181.4																						
MILES MONITORED	313.1																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	494.5	0
AQUATIC LIFE	479.6	14.9
PRIMARY CONTACT	426.2	68.3
SECONDARY CONTACT	494.5	0
DRINKING SUPPLY	471.1	23.4
AGRI & INDUSTRY	471.1	23.4

Figure A-41: Planning Segment 3H – NPDES Permitted Facilities





(Segment 3H)

Table A-117: Segment 3H Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0001341	ARKHOLA-VAN BUREN SAND PLANT	ARKANSAS R	11110104	3H
AR0001392	ENTERGY AR, INC-AR NUCLEAR 1	LAKE DARDANELLE	11110202	3H
AR0001511	GERBER PRODUCTS CO-FT SMITH	ARKANSAS R	11110104	3H
AR0001759	ARKANSAS ELECTRIC COOP-FITZHUG	ARKANSAS R	11110201	3H
AR0001791	FORT JAMES OPERATING CO	DITCH, SIXTH ST DITCH, ARKANSAS R	11110104	3H
AR0020648	USDAFS-CASS CCC-JOB CORPS	FANE CR,MULBERRY R	11110201	3H
AR0020737	GREENVILLE TUBE CORP	DITCH,SPADRA CR,LAKE DARDANELLE	11110202	3H
AR0021466	ALMA, CITY OF	ARKANSAS R	11110201	3H
AR0021482	VAN BUREN, CITY OF-MAIN PLANT	ARKANSAS R	11110104	3H
AR0021512	MOUNTAINBURG, CITY OF	TRIB/PIGEON CR,ARKANSAS R	11110201	3H
AR0021563	OZARK, CITY OF	ARKANSAS R	11110201	3H
AR0021750	FORT SMITH, CITY OF (MASSARD W	ARKANSAS R	11110104	3H
AR0021857	PARIS, CITY OF	SHORT MOUNTAIN CR,6-MI CR	11110202	3H
AR0022187	CLARKSVILLE, CITY OF	BLUE CR,SPADRA CR,LAKE DARDANELLE	11110202	3H
AR0022454	GREENWOOD, CITY OF	TRIB/VACHE GRASSE CR/ARKANSAS R	11110201	3H
AR0033278	FORT SMITH, CITY OF ("P" STREET)	ARKANSAS R	11110104	3H
AR0033791	CHARLESTON, CITY OF	DOCTORS CR/BIG CR	11110201	3H
AR0034070	LAVACA, CITY OF	ARKANSAS R	11110201	3H
AR0034592	WIEDERKEHR WINE CELLARS INC	WATERSHED LAKE,DIRTY CR,HORSESHOE CR	11110202	3H
AR0034932	MULBERRY, CITY OF	ARKANSAS R	11110201	3H
AR0035491	LAMAR, CITY OF	TRIB, CABIN CR,ARKANSAS R	11110202	3H
AR0036552	BEKAERT CORPORATION	ARKANSAS R	11110104	3H
AR0037567	VAN BUREN-LEE CR INDUSTRIAL PK	ARKANSAS R	11110104	3H
AR0037851	SGL CARBON CORP	TRIB,WEST CR,ARKANSAS R	11110202	3H

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0037940	AR PARKS & TOURISM-DEVIL'S DEN	DITCH,LEE CR,ARKANSAS R	11110104	3H
AR0037966	AR PARKS & TOURISM-MT NEBO ST PARK	TRIB, CHICKALAH CR	11110104	3H
AR0039268	TYSON FOODS INC-CLARKSVILLE	TRIB,BLUE CR,SPADRA CR,ARKANSAS R	11110202	3H
AR0039730	QUANEX CORP-MACSTEEL DIV	MASSARD CR TRIB	11110104	3H
AR0040720	VAN BUREN PUB SCHOOL-TATE ELEM	MAYS CR TRIB	11110201	3H
AR0040967	VAN BUREN, CITY OF-NORTH	LEE CREEK	11110104	3H
AR0040983	MOUNTAIN VIEW LODGE, INC	TRIB,ARKANSAS R	11110201	3H
AR0040991	SUBIACO, TOWN OF	CANE CR	11110202	3H
AR0041289	CEDARVILLE PUBLIC SCHOOLS	LITTLE WEBER CR TRIB,LEE CR	11110104	3H
AR0042447	TYSON FOODS INC-TRAINING CTR	LAKE DARDENELLE ON ARKANSAS R	11110202	3H
AR0042455	TYSON FOODS INC-RIVER VALLEY	ARKANSAS R	11110202	3H
AR0043699	CONCORD BAPTIST CHURCH	TRIB/FROG BAYOU	11110201	3H
AR0044385	S&D PROPERTIES-D/B/A CABANA ES	TRIB,FLAT ROCK CR	11110104	3H
AR0044636	COUNTY LINE SCHOOL DIST	N FORK-LITTLE CR/6 MILE CR	11110202	3H
AR0044725	ALTUS, CITY OF	ARKANSAS R	11110202	3H
AR0044938	ECOLOGY MGT, INC	ARKANSAS R	11110104	3H
AR0045063	ARKHOLA-PRESTON QUARRY	DITCH,TRIB,FLAT ROCK CR,ARKANSAS R	11110104	3H
AR0045365	ARKHOLA-JENNY LIND QUARRY	DITCH, BEAR CR, VACHE GRASSE CR	11110201	3H
AR0045683	AR HWY DEPT-BIG PINEY EAST	TRIB,BIG PINEY CR,LAKE DARDENELLE	11110202	3H
AR0045691	AR HWY DEPT-BIG PINEY-WEST	TRIB,LAKE DARDANELLE	11110202	3H
AR0046396	PLEASANT VIEW ESTATES	DITCH,LAKE DARDANELLE	11110202	3H
AR0047686	COAL HILL, CITY OF	ARKANSAS R	11110202	3H
AR0048267	CARGILL, INC	ARKANSAS R	11110201	3H
AR0048801	BARLING, CITY OF	ARKANSAS R	11110201	3H
AR0049212	CARGILL, INC-FEED MILL	HWY DITCH,CEDAR CR,ARKANSAS R	11110202	3H

Table A-118: ARK0011B Short Mountain Cr. Downstream of Paris, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	47	8.06	3.42	13.10	2.51
BOD_5 (mg/L)	51	1.06	0.00	6.52	0.93
pH (standard units)	52	7.19	5.00	8.73	0.56
Total Organic Carbon (mg/L)	50	3.34	2.11	6.48	0.87
Ammonia as N (mg/L)	54	0.06	<0.005	0.21	0.05
NO_2+NO_3 as N (mg/L)	53	1.91	0.081	6.21	1.73
Orthophosphate as P (mg/L)	54	0.22	0.006	0.72	0.21
Total phosphorus as P (mg/L)	51	0.26	0.01	0.72	0.22
Total hardness (mg/L)	25	37.43	11	167.00	30.99
Chloride (mg/L)	54	11.88	0.44	129.00	17.64
Sulfate (mg/L)	55	18.93	<0.04	74.20	12.64
Total dissolved solids (mg/L)	41	116.79	43.5	437.00	82.76
Total suspended solids (mg/L)	40	6.94	<1.0	50.80	8.97
Turbidity (NTU)	54	10.01	2.6	39.00	8.22

Table A-119: ARK0033 Arkansas River at Ozark Lock & Dam

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	9.14	5.10	16.80	2.67
BOD_5 (mg/L)	55	1.51	0.61	5.24	0.76
pH (standard units)	56	7.57	6.00	8.80	0.58
Total Organic Carbon (mg/L)	53	4.91	1.8	7.30	1.02
Ammonia as N (mg/L)	58	0.04	<0.005	0.72	0.10
NO_2+NO_3 as N (mg/L)	57	0.43	<0.01	4.54	0.61
Orthophosphate as P (mg/L)	58	0.07	<0.005	0.70	0.11
Total phosphorus as P (mg/L)	53	0.12	0.033	0.72	0.09
Total hardness (mg/L)	27	135.42	46	202.00	34.75
Chloride (mg/L)	57	100.84	0.43	356.00	72.61
Sulfate (mg/L)	59	59.05	<0.04	108.96	19.91
Total dissolved solids (mg/L)	45	329.64	158.5	546.50	89.88
Total suspended solids (mg/L)	44	22.39	3.5	149.00	25.34
Turbidity (NTU)	58	25.89	4.6	150.00	25.34

Table A-120: ARK0038 Arkansas River Near Fort Smith, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	49	9.67	5.40	16.40	2.85
BOD_5 (mg/L)	53	1.81	0.80	4.51	0.68
pH (standard units)	54	7.59	6.09	9.05	0.59
Total Organic Carbon (mg/L)	51	5.04	3.518	7.40	0.81
Ammonia as N (mg/L)	56	0.03	<0.005	0.09	0.03
NO_2+NO_3 as N (mg/L)	55	0.37	<0.01	1.08	0.26
Orthophosphate as P (mg/L)	56	0.05	0.008	0.14	0.03
Total phosphorus as P (mg/L)	53	0.11	0.033	0.23	0.04
Total hardness (mg/L)	27	140.51	62	194.00	32.90
Chloride (mg/L)	55	104.2	12.76	337.00	78.38
Sulfate (mg/L)	57	60.4	17.11	98.17	19.72
Total dissolved solids (mg/L)	43	330.94	114	547.00	98.20
Total suspended solids (mg/L)	42	23.27	3.5	75.00	15.81
Turbidity (NTU)	55	30.26	5.3	130.00	24.95

Table A-121: ARK0042 Mulberry River at I-40

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	43	8.99	5.52	13.26	2.25
BOD_5 (mg/L)	47	0.46	0.00	3.06	0.49
pH (standard units)	48	7.27	4.00	8.71	0.66
Total Organic Carbon (mg/L)	43	1.7	<1.0	9.78	1.38
Ammonia as N (mg/L)	48	0.01	<0.005	0.04	0.01
NO_2+NO_3 as N (mg/L)	47	0.15	<0.01	0.47	0.11
Orthophosphate as P (mg/L)	48	0.01	<0.005	0.11	0.02
Total phosphorus as P (mg/L)	46	0.03	<0.005	0.17	0.03
Total hardness (mg/L)	22	10.7	7	14.00	1.75
Chloride (mg/L)	49	1.79	0.43	3.49	0.58
Sulfate (mg/L)	49	3.01	<0.04	7.60	0.87
Total dissolved solids (mg/L)	35	32.53	25	56.00	5.90
Total suspended solids (mg/L)	34	2.61	<1.0	11.00	2.17
Turbidity (NTU)	48	7.59	1.7	50.00	8.24

Table A-122: ARK0043 Big Piney Creek at Hwy 164

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	9.68	6.20	16.12	1.90
BOD_5 (mg/L)	55	0.43	0.00	1.35	0.35
pH (standard units)	57	7.1	6.06	8.21	0.38
Total Organic Carbon (mg/L)	58	1.56	<1.0	4.80	0.81
Ammonia as N (mg/L)	59	0.01	<0.005	0.12	0.02
NO_2+NO_3 as N (mg/L)	59	0.1	<0.01	0.55	0.10
Orthophosphate as P (mg/L)	59	0.01	<0.005	0.18	0.02
Total phosphorus as P (mg/L)	57	0.02	0.01	0.18	0.03
Total hardness (mg/L)	28	20.86	13	30.00	5.32
Chloride (mg/L)	60	4.59	1.08	156.00	19.93
Sulfate (mg/L)	60	4	2.57	49.30	5.96
Total dissolved solids (mg/L)	47	43.67	25	257.50	32.83
Total suspended solids (mg/L)	47	2.11	<1.0	56.00	8.06
Turbidity (NTU)	58	5.65	<1.0	57.00	8.33

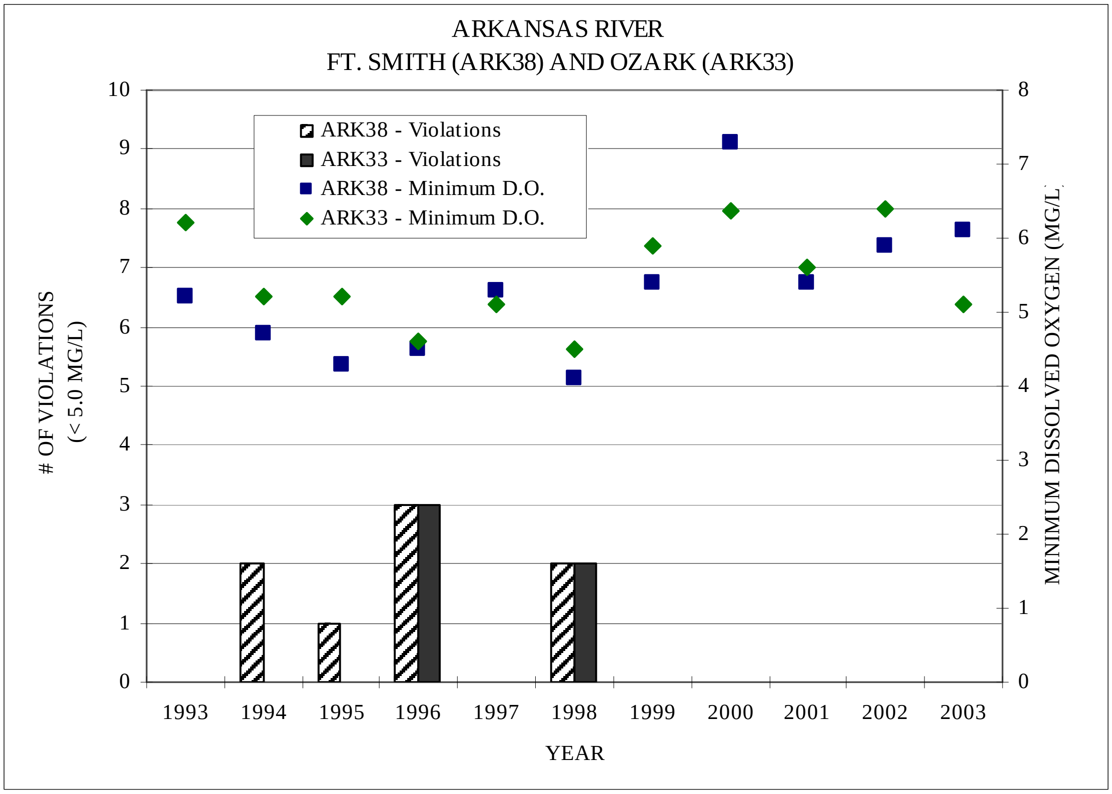
Table A-123: ARK0044 Illinois Bayou NW of Dover, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	8.96	2.90	15.99	2.23
BOD_5 (mg/L)	54	0.58	0.00	2.13	0.49
pH (standard units)	56	6.79	6.21	7.73	0.30
Total Organic Carbon (mg/L)	57	2.03	<1.0	4.70	1.02
Ammonia as N (mg/L)	58	0.01	<0.005	0.04	0.01
NO_2+NO_3 as N (mg/L)	58	0.2	<0.01	1.07	0.25
Orthophosphate as P (mg/L)	58	0.01	<0.005	0.03	0.01
Total phosphorus as P (mg/L)	56	0.03	0.01	0.16	0.02
Total hardness (mg/L)	28	15.93	8	146.00	25.57
Chloride (mg/L)	59	2.7	1.3	8.08	1.49
Sulfate (mg/L)	59	2.99	2.21	5.16	0.48
Total dissolved solids (mg/L)	48	33.31	19	63.00	7.20
Total suspended solids (mg/L)	48	4.74	<1.0	111.00	15.85
Turbidity (NTU)	57	8.87	2.2	81.00	11.71

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)	17	9.58	5.80	12.70	2.12
BOD_5 (mg/L)	24	1.36	0.66	2.34	0.42
pH (standard units)	25	7.58	7.24	8.40	0.28
Total Organic Carbon (mg/L)	25	4.77	3.645	6.60	0.81
Ammonia as N (mg/L)	25	0.03	<0.005	0.06	0.02
NO_2+NO_3 as N (mg/L)	24	0.4	0.03	1.58	0.35
Orthophosphate as P (mg/L)	25	0.05	0.017	0.10	0.02
Total phosphorus as P (mg/L)	23	0.09	0.047	0.13	0.02
Total hardness (mg/L)	12	151.24	124	180.00	19.29
Chloride (mg/L)	24	93.53	41.84	166.48	34.32
Sulfate (mg/L)	25	66.22	34.4	96.15	15.62
Total dissolved solids (mg/L)	25	379.6	222.5	535.00	84.66
Total suspended solids (mg/L)	25	17.02	5.5	47.50	9.47
Turbidity (NTU)	25	21.01	5	57.00	14.45

Figure A-42: Arkansas River Minimum Values for Dissolved Oxygen, # Standard Violations



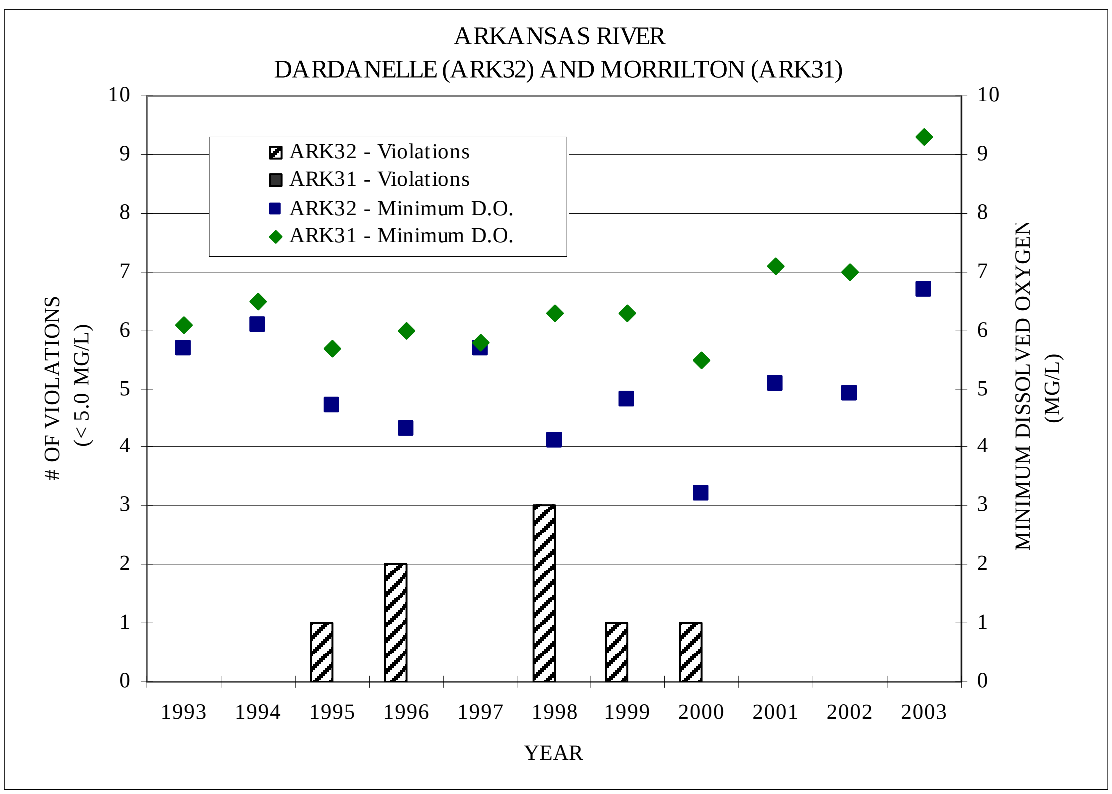
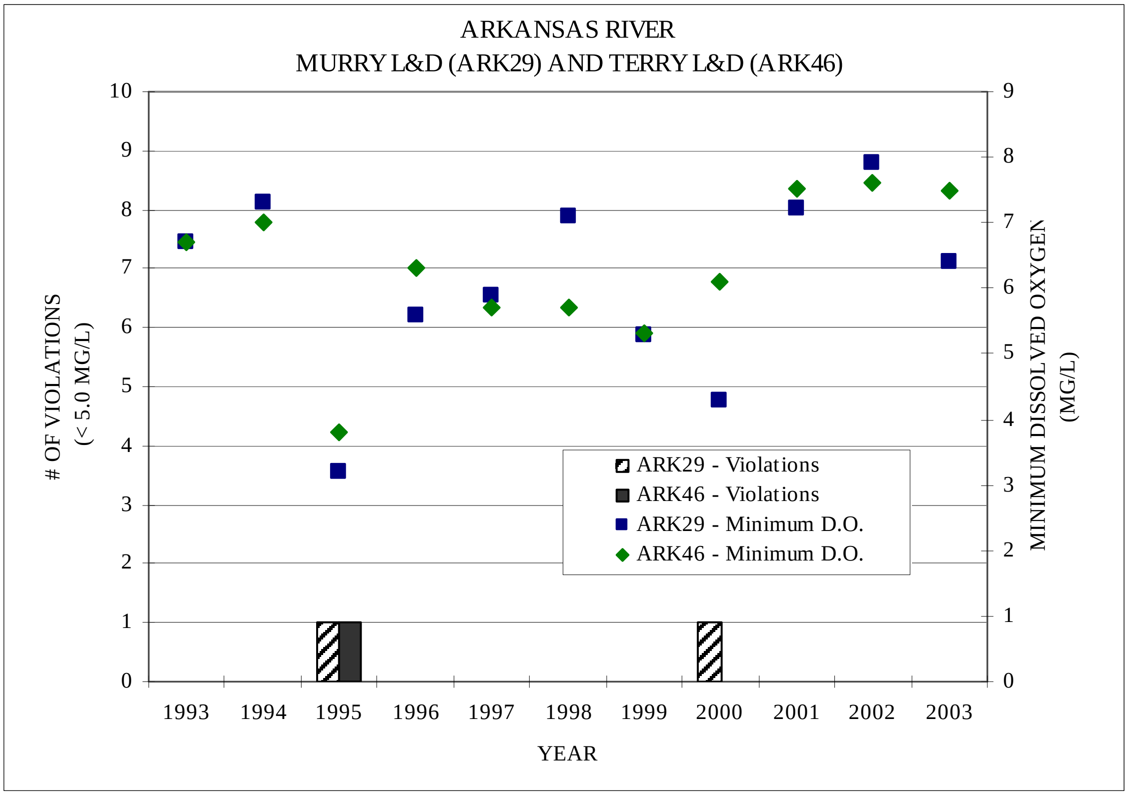
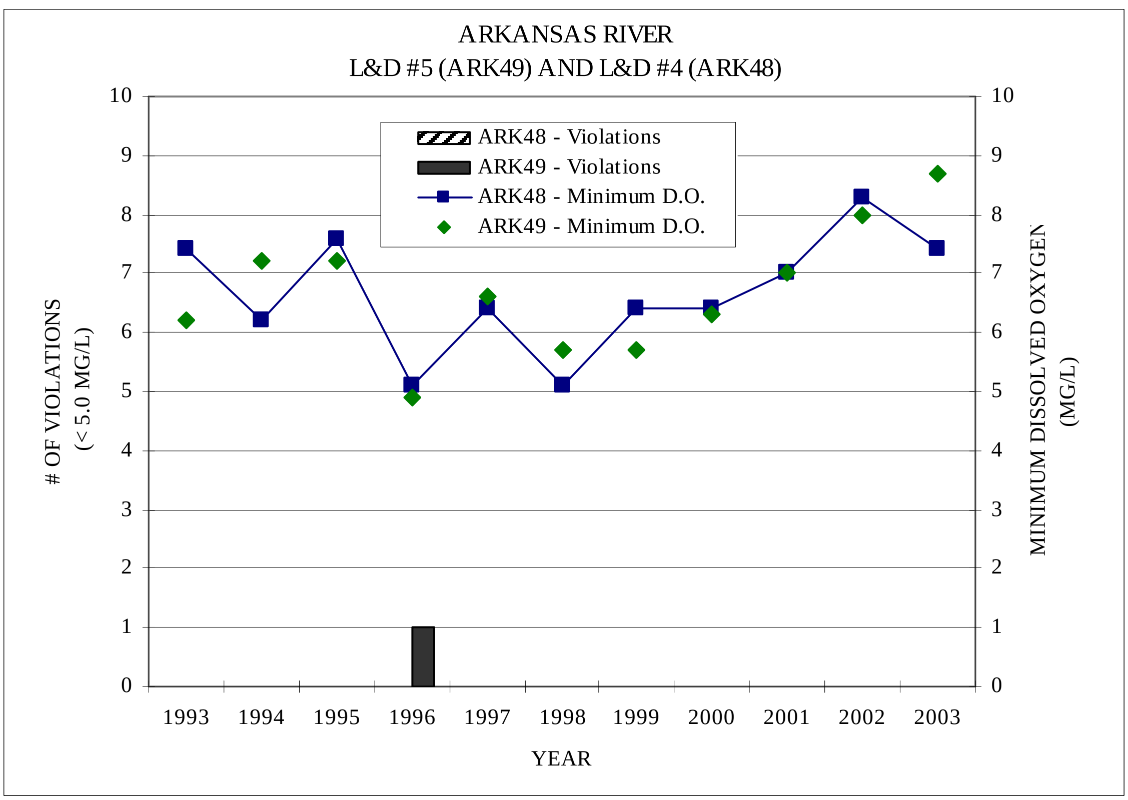


Figure A-43: Arkansas River Minimum Values for Dissolved Oxygen, # Standard Violations





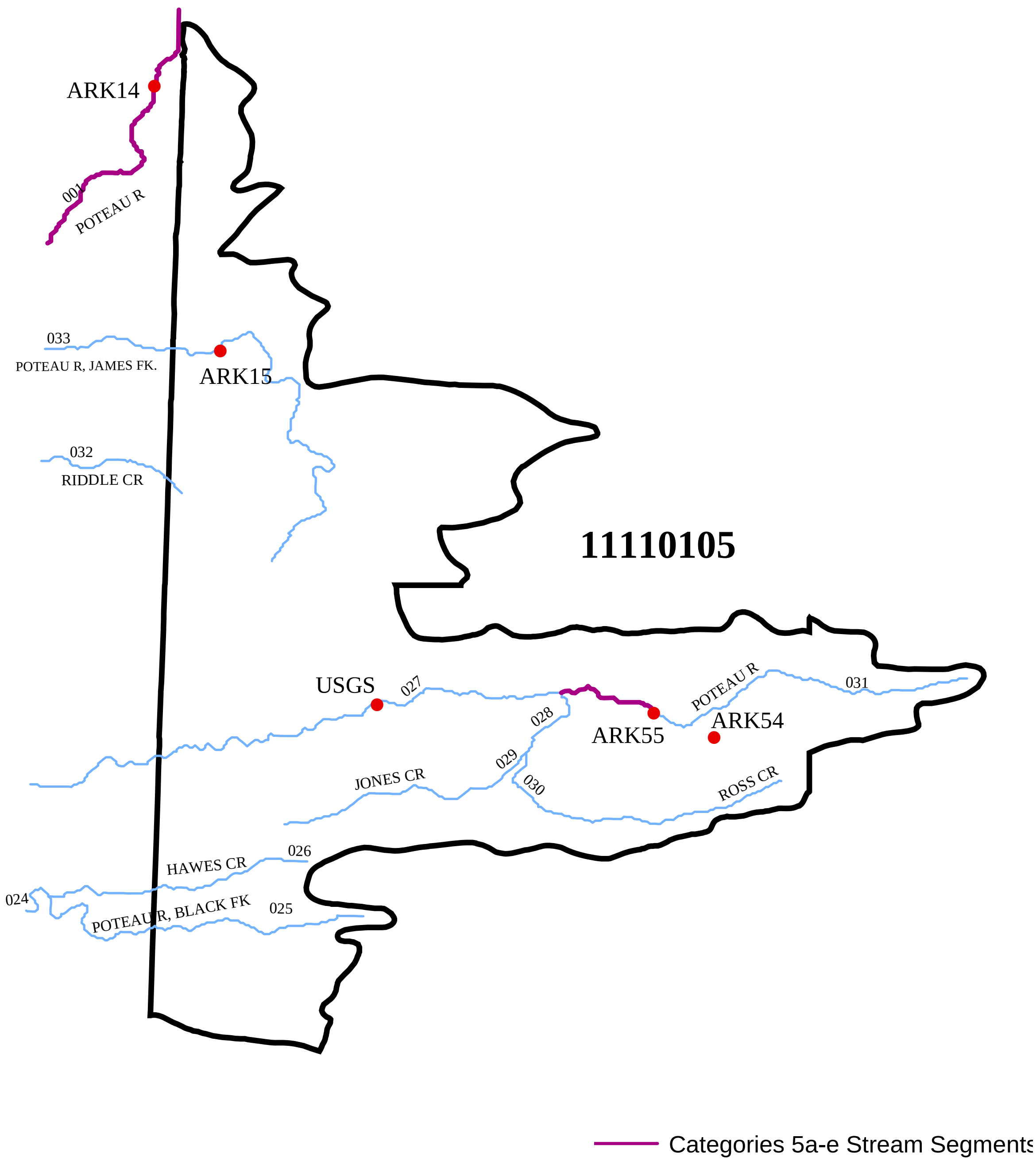
SEGMENT 3I POTEAU RIVER

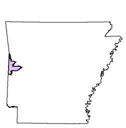
Segment 3I is located on the western edge of Arkansas, just south of the Arkansas River. This segment includes large portions of Scott and Sebastian Counties and a small part of northwestern Polk County. The waters of this segment include the Poteau River from its headwaters to the Oklahoma state line, 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 is listed as not supporting aquatic life uses due to elevated metals. Both a municipal and industrial discharge occurs in this segment. Additionally, very high nutrient values exist in the Poteau River below these discharges.

Figure A-44: Planning Segment 3I – Monitoring Stations





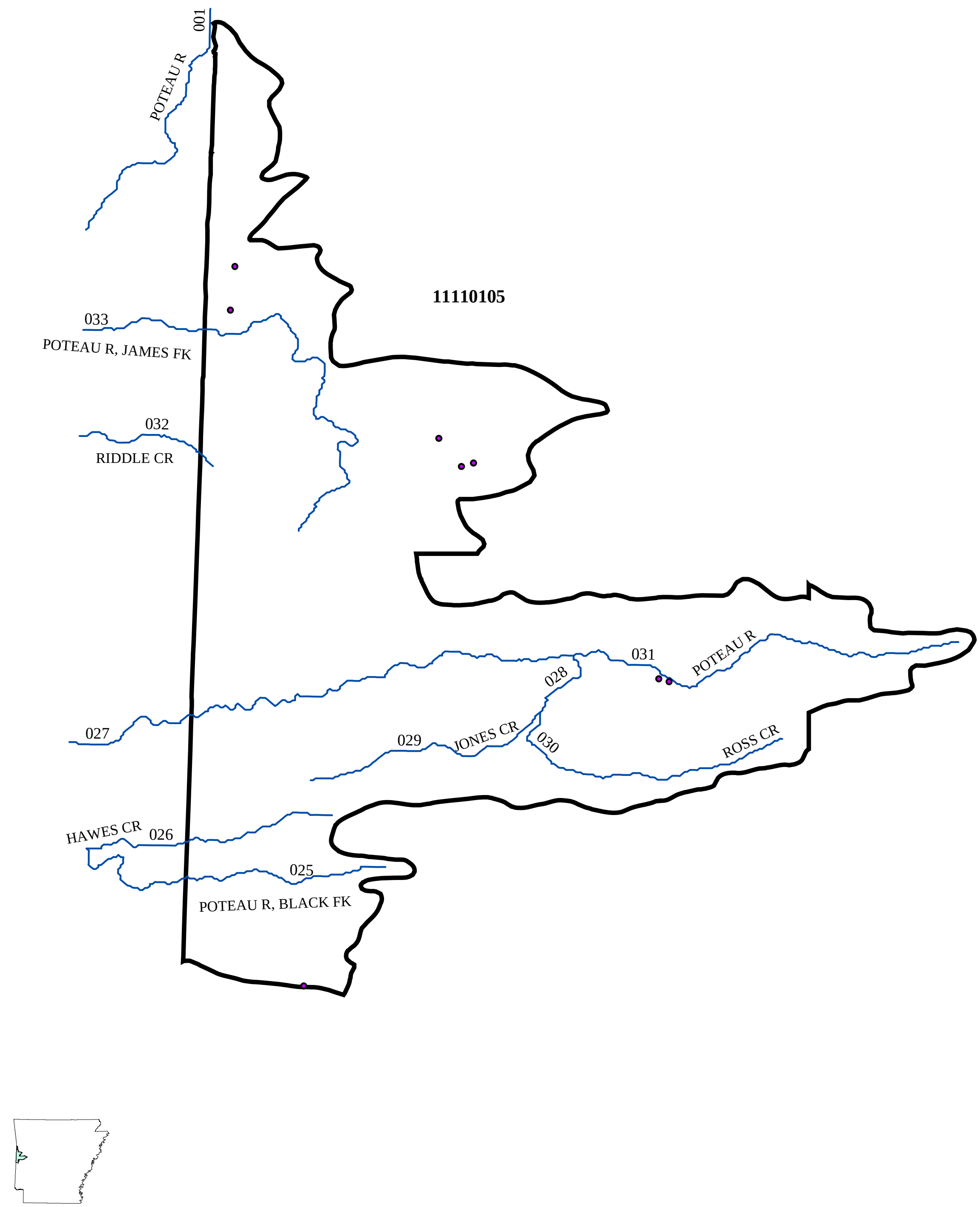
(Segment 3I)

Table A-125: Planning Segment 3I—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-3I																										
Poteau River	11110105	-001	2	ARK14	M	S	N	S	S	S	S	SE				SI				5a				FISH CONSUMPTION	55.8	0
Black Fork	11110105	-025	8		U															3				AQUATIC LIFE	47.2	8.6
Poteau River	11110105	-027	16	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		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	ARK54	M	S	S	S	S	S	S									1						
Poteau River	11110105	-031	6.6	ARK55	M	S	N	S	S	R	S	SE	IP	MP		SI	NO3	Cu	Zn	5a	5a	5c	5c			
James Fork	11110105	-033	18.4	ARK15	M	S	S	S	S	S	S									1						
TOTAL MILES	105.3																									
MILES UNASSESSED	49.5																									
MILES EVALUATED	0																									
MILES MONITORED	55.8																									

This impairment is caused by a combination of a municiple and industrial point source discharges.

Figure A-45: Planning Segment 3I – NPDES Permitted Facilities



(Segment 3I)

Table A-126: Segment 3I Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0035769	WALDRON, CITY OF	TRIB,POTEAU R,ARKANSAS R	11110105	3I
AR0036293	MANSFIFLD, CITY OF	COOP-CHEROKEE CR/PRAIRIE CR	11110105	3I
AR0037419	HUNTINGTON, CITY OF	CHEROKEE CR,PRAIRIE CR,JAMES FORK R	11110105	3I
AR0038482	TYSON FOODS INC-WALDRON	POTEAU R TRIB	11110105	3I
AR0039781	HACKETT, CITY OF	BIG BRANCH HACKETT CR,JAMES FORK,POTEAU R	11110105	3I
AR0041165	SEBASTIAN LAKE UTILITY CO, INC	TRIB/HACKETT CR/BIG BRANCH	11110105	3I
AR0044679	HARTFORD SCHOOL DIST	TRIB/WEST CR	11110105	3I
AR0048232	TRAVIS LUMBER CO, INC	TRIB,COOP CR,CHEROKEE CR,JAMES FORK	11110105	3I

Table A-127: ARK0014 Poteau River Near Fort Smith, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	49	8.25	4.38	14.40	2.36
BOD_5 (mg/L)	53	2.3	0.00	8.96	1.88
pH (standard units)	55	7.31	6.30	9.02	0.48
Total Organic Carbon (mg/L)	51	5.69	3.5	9.19	1.08
Ammonia as N (mg/L)	56	0.04	<0.005	0.21	0.04
NO_2+NO_3 as N (mg/L)	55	0.33	0.01	1.43	0.27
Orthophosphate as P (mg/L)	56	0.03	<0.005	0.09	0.02
Total phosphorus as P (mg/L)	53	0.12	0.01	0.28	0.06
Total hardness (mg/L)	27	40	11	94.00	21.12
Chloride (mg/L)	56	8.1	1.62	86.50	12.21
Sulfate (mg/L)	57	17.24	3.18	36.80	7.58
Total dissolved solids (mg/L)	43	98.48	38.5	190.50	33.80
Total suspended solids (mg/L)	42	34.96	5.5	285.00	45.44
Turbidity (NTU)	56	48.51	2	203.00	32.85

Table A-128: ARK0015 James Fork Near Hackett, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	45	8.28	4.57	13.30	2.24
BOD_5 (mg/L)	49	1.08	0.00	4.01	0.72
pH (standard units)	49	7.27	6.31	8.20	0.42
Total Organic Carbon (mg/L)	45	3.96	1.91	8.00	1.37
Ammonia as N (mg/L)	50	0.02	<0.005	0.10	0.02
NO_2+NO_3 as N (mg/L)	49	0.22	<0.01	1.57	0.29
Orthophosphate as P (mg/L)	50	0.02	<0.005	0.10	0.02
Total phosphorus as P (mg/L)	48	0.06	0.009	0.22	0.05
Total hardness (mg/L)	24	80.25	10	139.00	39.65
Chloride (mg/L)	51	5.72	2.56	11.60	1.81
Sulfate (mg/L)	51	50.07	5.87	111.60	23.02
Total dissolved solids (mg/L)	37	148.58	43	260.00	58.29
Total suspended solids (mg/L)	36	12.79	2.5	84.50	16.65
Turbidity (NTU)	50	17.65	4.4	80.00	16.79

Table A-129: ARK0054 Poteau River Upstream of Waldron, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	36	9.38	4.39	14.60	2.62
BOD_5 (mg/L)	40	1.8	0.00	7.96	1.79
pH (standard units)	42	7.32	4.00	8.63	0.71
Total Organic Carbon (mg/L)	36	5.47	2.826	12.60	2.39
Ammonia as N (mg/L)	41	0.02	<0.005	0.26	0.05
NO_2+NO_3 as N (mg/L)	40	0.17	<0.01	1.07	0.26
Orthophosphate as P (mg/L)	41	0.04	<0.005	0.44	0.10
Total phosphorus as P (mg/L)	39	0.12	0.01	0.97	0.19
Total hardness (mg/L)	19	27.18	12	66.00	15.24
Chloride (mg/L)	42	6.11	2.33	14.10	2.83
Sulfate (mg/L)	42	11.28	4.75	30.50	6.19
Total dissolved solids (mg/L)	28	67.48	45	159.00	23.70
Total suspended solids (mg/L)	27	24.16	<1.0	408.00	80.95
Turbidity (NTU)	41	28.72	2.2	390.00	63.72

Table A-130: ARK0055 Poteau River Downstream of Waldron, Ar

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	48	7.72	3.80	14.21	2.38
BOD_5 (mg/L)	52	4.63	0.73	27.10	4.67
pH (standard units)	53	7.14	6.32	8.30	0.38
Total Organic Carbon (mg/L)	50	7.09	3.96	12.60	1.70
Ammonia as N (mg/L)	55	1.08	<0.005	12.40	2.00
NO_2+NO_3 as N (mg/L)	54	4.54	0.024	27.90	7.19
Orthophosphate as P (mg/L)	55	3.19	0.006	15.13	3.71
Total phosphorus as P (mg/L)	51	3.91	0.078	22.89	4.76
Total hardness (mg/L)	27	35.85	13	77.00	17.36
Chloride (mg/L)	54	48.06	3.62	181.00	34.89
Sulfate (mg/L)	56	57.39	<0.04	172.00	41.38
Total dissolved solids (mg/L)	42	258.17	49.5	547.00	162.86
Total suspended solids (mg/L)	41	26.52	2	239.30	46.16
Turbidity (NTU)	55	17.01	1.4	190.00	26.06

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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

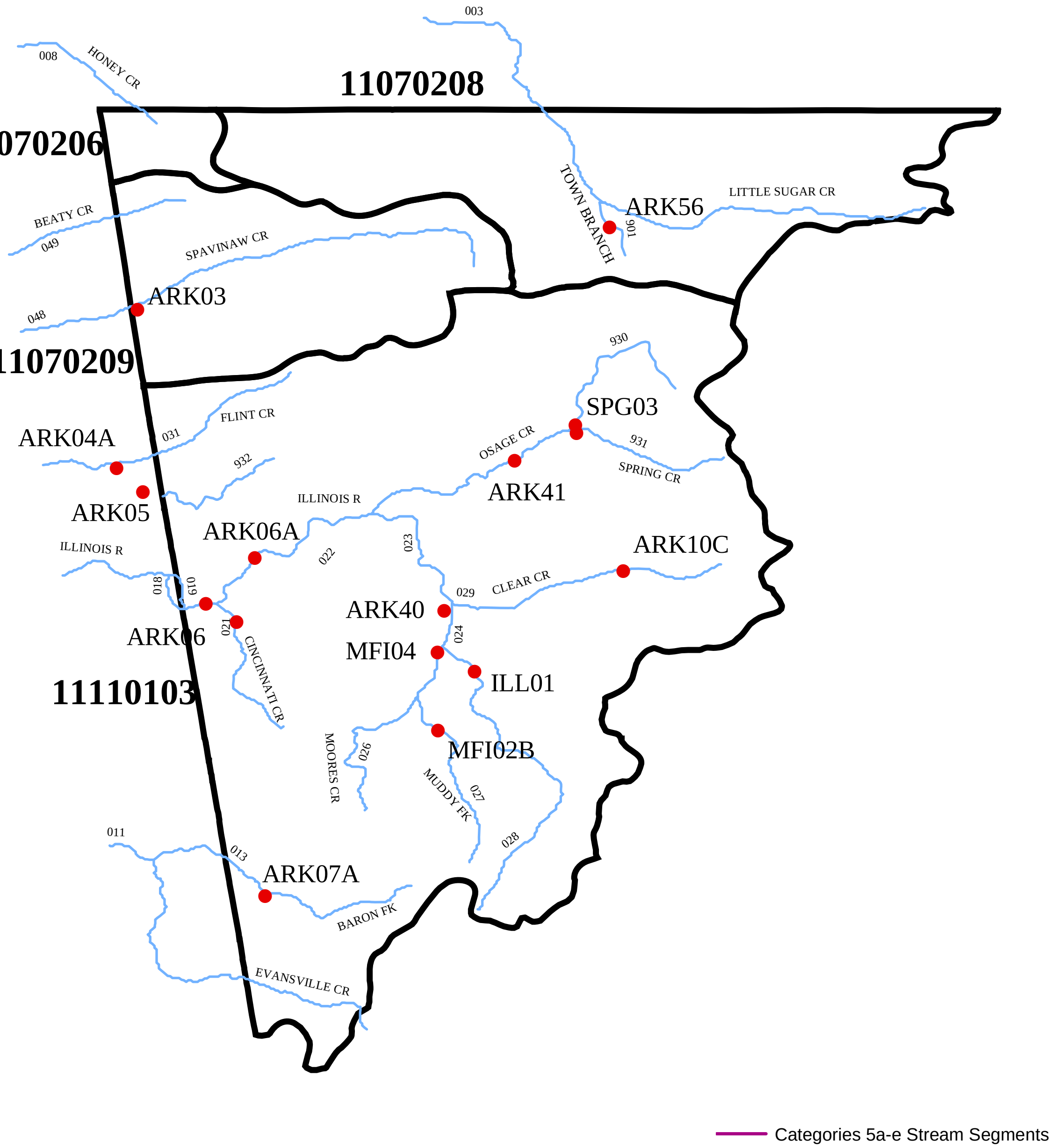
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. This segment contains 203.7 stream miles. Eleven permanent monitoring stations and several temporary stations in this planning segment were utilized to monitor 171.6 stream miles. An additional 8.1 stream miles were evaluated. Nonpoint source impacts affecting waters in this segment are primarily from pasture land that is also used for application 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.

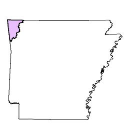
A municipal point source discharge is impairing the aquatic life use and the drinking water use in Town Branch from excessive nutrient discharges and elevated metals.

Three major municipal, point source discharges enter the Illinois River via Osage Creek and Clear Creek, and a minor municipal discharge enters the Illinois from Muddy Fork of the Illinois River. Other significant municipal discharges occur into Sager Creek and Spavinaw Creek.

Since 1995, the trend of nitrite + nitrate nitrogen at this station has shown a noticeable increase; however the total phosphorus trend has remained fairly constant. At the Osage Creek station several miles above its confluence with the Illinois River, both nitrates and phosphorus trends are increasing and the values are noticeably greater than the upper Illinois River. The station on the Illinois River at the State line also shows upward trends in nitrogen and phosphorus which most likely reflects the influence of Osage Creek on the Illinois River. This is most noticeable during low run-off periods.

Figure A-46: Planning Segment 3J – Monitoring Stations





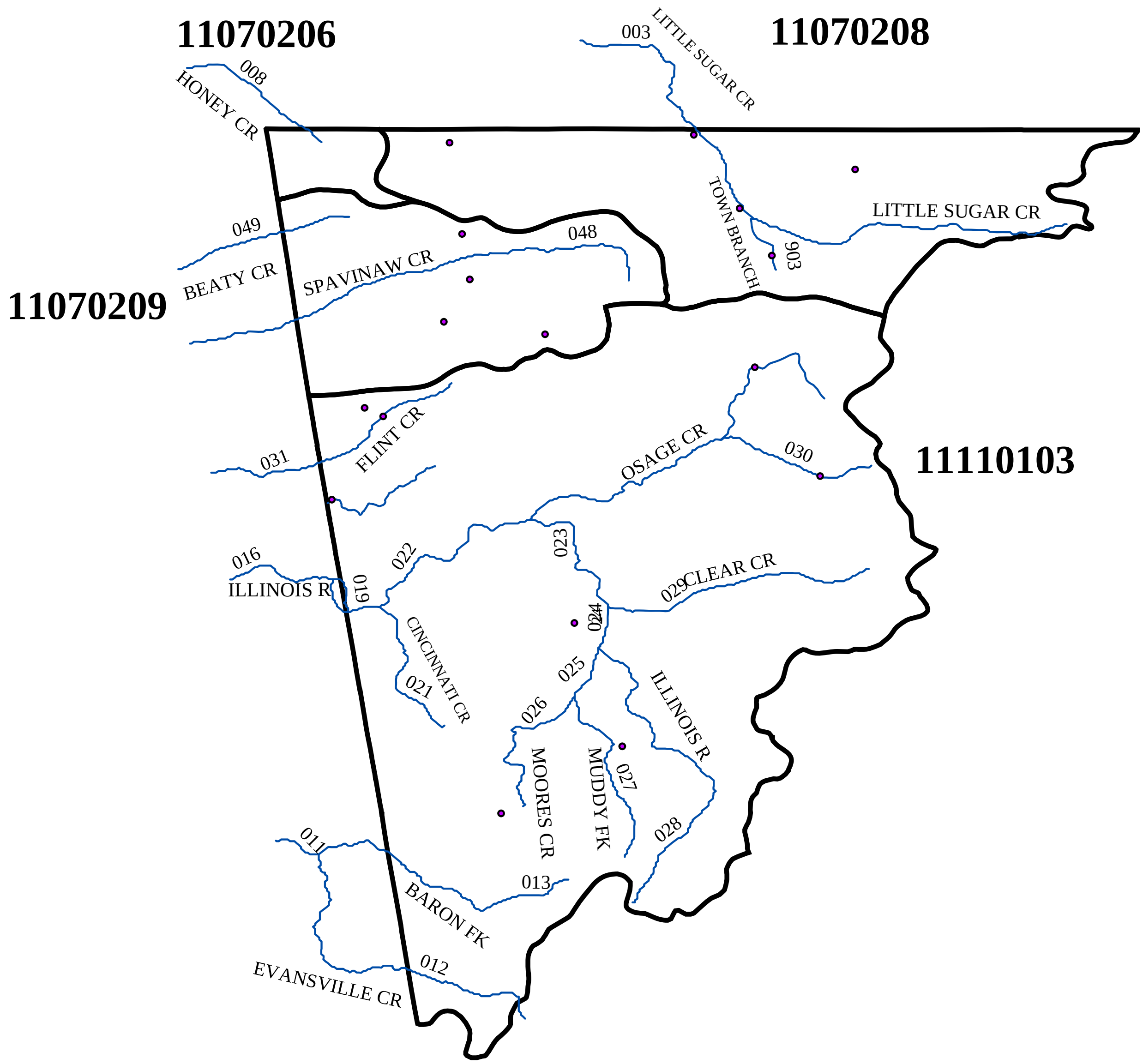
(Segment 3J)

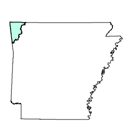
Table A-131: Planning Segment 3J—Designated Use Attainment Status

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-3J																							
Evansville Cr.	11110103	-012	9		U															3			
Baron Fork	11110103	-013	10	ARK07	M	S	S	S	S	S	S									1			
Illinois River	11110103	-020	1.6	ARK06	M	S	S		S	S	S									2			
Cincinnati Cr.	11110103	-021	9	ARK141	M	S	S		S	S	S									2			
Illinois River	11110103	-022	10.8	ARK06A	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	ARK40	M	S	S	S	S	S	S									1			
Muddy Fork.	11110103	-025	3.2	MFI04+	M	S	S		S	S	S									2			
Moores Creek	11110103	-026	9.8		U															3			
Muddy Fork	11110103	-027	11	MFI02B+	M	S	S		S	S	S									2			
Illinois River	11110103	-028	19.9	ILL01	M	S	S		S	S	S									2			
Clear Creek	11110103	-029	13.5	ARK10C	M	S	S	N	S	S	S	UR				PA				5d			
Osage Creek	11110103	-030	15	ARK41	M	S	S	S	S	S	S									1			
Osage Creek	11110103	-930	5	OSC03+	M	S	S		S	S	S									2			
Spring Creek	11110103	-931	6	SPG03+	M	S	S		S	S	S									2			
Flint Creek	11110103	-031	9.6	ARK04A	M	S	S	S	S	S	S									1			
Sager Creek	11110103	-932	8	ARK05	M	S	S	S	S	S	S									1			
Spavinaw Cr.	11070209	-048	19.3	ARK03	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									2			
Town Branch	11070208	-901	3	ARK56	M	S	N	S	S	S	S	MP				TP				5d			
TOTAL MILES	203.7																						
MILES UNASSESSED	24																						
MILES EVALUATED	8.1																						
MILES MONITORED	171.6																						

USE	SUPPORT	NOT SUPPORT
FISH CONSUMPTION	179.7	0
AQUATIC LIFE	176.7	3
PRIMARY CONTACT	86.3	13.5
SECONDARY CONTACT	179.7	0
DRINKING SUPPLY	179.7	0
AGRI & INDUSTRY	179.7	0

Figure A-47: Planning Segment 3J – NPDES Permitted Facilities





(Segment 3J)

Table A-132: Segment 3J Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0020184	GENTRY, CITY OF	SWEPCO LAKE,LT FLINT CR	11110103	3J
AR0020273	SILOAM SPRINGS, CITY OF	SAGER CR/FLINT CR/ILLINOIS R	11110103	3J
AR0020672	PEA RIDGE, CITY OF	OTTER CR,BIG SUGAR CR,ELAKE R	11070208	3J
AR0022063	SPRINGDALE, CITY OF	SPRING CR,OSAGE CR,ILLINOIS R	11110103	3J
AR0022098	PRAIRIE GROVE, CITY OF	MUDDY FORK/ILLINOIS R	11110103	3J
AR0022292	DECATUR, CITY OF	COLUMBIA HOLLOW CR,SPAVINAW CR	11070209	3J
AR0022403	BENTONVILLE, CITY OF	TOWN BRANCH,LITTLE SUGAR CR	11070208	3J
AR0023833	GRAVETTE, CITY OF	RR HOLLOW/SPAVINAW/GRAND NEOSHO	11070209	3J
AR0033910	USDAFS-LAKE WEDINGTON REC AREA	ILLINOIS R TRIB	11110103	3J
AR0034258	VILLAGE WASTEWATER CO-NORTH	LITTLE SUGAR CR	11070208	3J
AR0034266	VILLAGE WASTEWATER CO, INC	LITTLE SUGAR CR	11070208	3J
AR0035246	LINCOLN, CITY OF	BUSH CR TRIB	11110103	3J
AR0036480	SULPHUR SPRINGS, CITY OF	BUTLER CR	11070208	3J
AR0037842	SOUTHWESTERN ELECTRIC POWER CO	SWEPCO RESEROIR,LITTLE FLINT CR,FLINT CR	11110103	3J
AR0043397	ROGERS, CITY OF	(1)OSAGE CR,ARKANSAS R-(2) “C” LAKE ARKANSAS R	11110103	3J
AR0046639	BENTON COUNTY STONE CO, INC	BUTLER CR TRIB	11070208	3J

Table A-133: ARK0003 Spavinaw Creek N of Cherokee, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	10.32	6.82	14.50	1.72
BOD_5 (mg/L)	55	0.33	0.00	1.24	0.29
pH (standard units)	53	7.79	6.88	8.71	0.39
Total Organic Carbon (mg/L)	50	1.42	<1.0	6.59	0.93
Ammonia as N (mg/L)	58	0.01	<0.005	0.28	0.04
NO_2+NO_3 as N (mg/L)	56	4.1	0.07	6.95	1.03
Orthophosphate as P (mg/L)	58	0.29	0.035	3.18	0.39
Total phosphorus as P (mg/L)	52	0.24	0.036	0.43	0.07
Total hardness (mg/L)	26	132.42	113	150.00	8.29
Chloride (mg/L)	57	12.82	6.1	18.20	2.86
Sulfate (mg/L)	57	7.02	6.01	11.30	0.87
Total dissolved solids (mg/L)	46	193.34	151.5	380.00	31.55
Total suspended solids (mg/L)	47	1.37	<1.0	13.50	2.45
Turbidity (NTU)	55	1.3	<1.0	10.00	1.75

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)	52	11.11	6.07	88.82	11.15
BOD_5 (mg/L)	55	0.52	0.00	1.85	0.36
pH (standard units)	52	7.56	7.01	8.39	0.29
Total Organic Carbon (mg/L)	49	1.66	<1.0	4.15	0.77
Ammonia as N (mg/L)	57	0.01	<0.005	0.12	0.02
NO_2+NO_3 as N (mg/L)	55	2.19	0.372	8.05	1.40
Orthophosphate as P (mg/L)	57	0.05	<0.005	0.76	0.10
Total phosphorus as P (mg/L)	51	0.04	0.01	0.19	0.03
Total hardness (mg/L)	26	111	97	123.00	7.57
Chloride (mg/L)	56	10.15	6.04	14.60	1.54
Sulfate (mg/L)	56	18.84	8.09	33.30	5.98
Total dissolved solids (mg/L)	45	168.08	135.5	249.00	17.34
Total suspended solids (mg/L)	46	3.03	<1.0	13.00	3.07
Turbidity (NTU)	54	2.7	<1.0	13.20	2.54

Table A-135: ARK0005 Sager Creek Near Siloam Springs, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	53	10.09	6.71	16.43	1.98
BOD_5 (mg/L)	56	0.82	0.12	3.21	0.58
pH (standard units)	52	7.61	6.23	8.93	0.53
Total Organic Carbon (mg/L)	50	3.38	1.76	6.07	1.08
Ammonia as N (mg/L)	58	0.02	<0.005	0.22	0.03
NO_2+NO_3 as N (mg/L)	56	7.62	1.34	15.60	2.65
Orthophosphate as P (mg/L)	58	1.02	0.012	2.18	0.48
Total phosphorus as P (mg/L)	52	1.03	0.146	2.12	0.46
Total hardness (mg/L)	26	130.19	98	166.00	16.31
Chloride (mg/L)	56	39.23	9.37	129.64	19.74
Sulfate (mg/L)	57	20.83	11.2	49.80	9.24
Total dissolved solids (mg/L)	46	255.35	159	416.00	60.47
Total suspended solids (mg/L)	47	3.24	<1.0	24.50	3.85
Turbidity (NTU)	55	3.36	<1.0	17.00	3.70

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	9.78	5.71	13.75	1.94
BOD_5 (mg/L)	56	0.65	0.00	2.47	0.48
pH (standard units)	52	7.69	6.41	8.82	0.46
Total Organic Carbon (mg/L)	50	2.29	1.132	4.90	0.90
Ammonia as N (mg/L)	58	0.01	<0.005	0.12	0.02
NO_2+NO_3 as N (mg/L)	56	2.43	0.968	3.66	0.59
Orthophosphate as P (mg/L)	58	0.23	0.071	0.55	0.10
Total phosphorus as P (mg/L)	52	0.25	0.072	0.52	0.10
Total hardness (mg/L)	27	120.22	84	145.00	12.76
Chloride (mg/L)	57	15.21	5.36	26.13	5.24
Sulfate (mg/L)	57	14.09	8.04	28.29	4.26
Total dissolved solids (mg/L)	45	180.83	118.5	215.00	22.47
Total suspended solids (mg/L)	46	11.25	<1.0	78.00	16.58
Turbidity (NTU)	55	9.94	<1.0	75.00	14.52

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)	50	11.19	3.20	18.17	3.14
BOD_5 (mg/L)	53	0.92	0.00	2.84	0.55
pH (standard units)	48	7.95	6.27	9.47	0.58
Total Organic Carbon (mg/L)	47	3.19	1.6	7.23	1.24
Ammonia as N (mg/L)	54	0.02	<0.005	0.08	0.02
NO_2+NO_3 as N (mg/L)	52	2.17	0.26	5.98	1.24
Orthophosphate as P (mg/L)	54	0.08	<0.005	0.28	0.06
Total phosphorus as P (mg/L)	49	0.1	0.01	0.33	0.07
Total hardness (mg/L)	26	141.19	112	177.00	16.86
Chloride (mg/L)	53	9.63	3.08	19.90	3.66
Sulfate (mg/L)	53	17.86	8.9	30.83	4.58
Total dissolved solids (mg/L)	44	183.38	112	240.00	25.51
Total suspended solids (mg/L)	45	3.58	<1.0	41.00	6.60
Turbidity (NTU)	52	5.71	<1.0	54.00	9.37

Table A-138: ARK0010C Clear Creek at Hwy 112 Bridge

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	9.61	6.70	12.75	1.70
BOD_5 (mg/L)	52	1.05	0.00	7.37	1.18
pH (standard units)	50	7.65	7.08	8.34	0.30
Total Organic Carbon (mg/L)	46	3.64	1.437	15.60	1.94
Ammonia as N (mg/L)	54	0.05	<0.005	1.24	0.17
NO_2+NO_3 as N (mg/L)	52	2.52	1.32	5.39	0.90
Orthophosphate as P (mg/L)	54	0.04	<0.005	0.21	0.04
Total phosphorus as P (mg/L)	49	0.06	0.01	0.28	0.05
Total hardness (mg/L)	24	139.33	73	162.00	20.15
Chloride (mg/L)	53	17.77	5.7	38.90	8.60
Sulfate (mg/L)	53	37.08	9.31	92.50	17.93
Total dissolved solids (mg/L)	46	229.71	124	316.00	44.67
Total suspended solids (mg/L)	47	21.07	<1.0	630.00	94.40
Turbidity (NTU)	51	12.94	1.5	320.00	45.95

Table A-139: ARK0040 Illinois River Near Savoy, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	51	9.93	6.05	14.39	2.05
BOD_5 (mg/L)	54	0.93	0.00	3.26	0.56
pH (standard units)	50	7.71	6.06	8.77	0.47
Total Organic Carbon (mg/L)	48	2.96	1.491	6.90	1.16
Ammonia as N (mg/L)	56	0.02	<0.005	0.18	0.03
NO_2+NO_3 as N (mg/L)	54	2.09	0.851	3.99	0.74
Orthophosphate as P (mg/L)	56	0.05	<0.005	0.16	0.04
Total phosphorus as P (mg/L)	52	0.09	0.01	0.31	0.07
Total hardness (mg/L)	25	119.4	75	152.00	18.63
Chloride (mg/L)	55	7.84	3.58	11.10	1.86
Sulfate (mg/L)	55	10.75	4.91	18.24	3.18
Total dissolved solids (mg/L)	46	159.77	98.5	200.00	23.60
Total suspended solids (mg/L)	47	9.1	<1.0	43.80	9.85
Turbidity (NTU)	53	8.9	1.5	59.00	9.88

Table A-140: ARK0041 Osage Creek Near Elm Springs, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	10.14	6.42	18.10	2.65
BOD_5 (mg/L)	58	0.69	0.00	2.00	0.38
pH (standard units)	54	7.68	6.37	8.99	0.54
Total Organic Carbon (mg/L)	52	2.79	1.6	5.64	0.78
Ammonia as N (mg/L)	60	0.01	<0.005	0.15	0.02
NO_2+NO_3 as N (mg/L)	57	3.7	0.02	6.30	0.88
Orthophosphate as P (mg/L)	59	0.86	0.008	3.40	0.58
Total phosphorus as P (mg/L)	54	0.87	0.047	2.49	0.55
Total hardness (mg/L)	28	122.93	11	152.00	24.78
Chloride (mg/L)	59	25.8	3.07	40.16	8.90
Sulfate (mg/L)	59	21.54	2.18	42.30	8.83
Total dissolved solids (mg/L)	47	232.93	157.5	283.50	31.70
Total suspended solids (mg/L)	48	5.51	<1.0	29.50	5.80
Turbidity (NTU)	57	4.96	1	22.00	5.22

Table A-141: ARK0056 Little Sugar Creek Downstream of Bentonville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	8.17	5.46	12.11	1.46
BOD_5 (mg/L)	55	0.89	0.00	6.63	1.11
pH (standard units)	53	7.35	5.98	8.13	0.43
Total Organic Carbon (mg/L)	50	4.43	1.85	11.06	1.44
Ammonia as N (mg/L)	58	0.1	<0.005	2.19	0.34
NO_2+NO_3 as N (mg/L)	56	6.71	1.79	11.32	2.28
Orthophosphate as P (mg/L)	58	3.69	0.523	10.75	1.52
Total phosphorus as P (mg/L)	53	3.64	0.823	5.75	1.19
Total hardness (mg/L)	26	130.5	88	154.00	14.58
Chloride (mg/L)	57	35.3	15.3	54.20	9.97
Sulfate (mg/L)	57	34.9	17.17	51.80	8.61
Total dissolved solids (mg/L)	46	300.77	214.5	580.00	56.53
Total suspended solids (mg/L)	47	3.39	<1.0	32.50	5.31
Turbidity (NTU)	55	9.77	<1.0	363.00	48.73

White River Basin

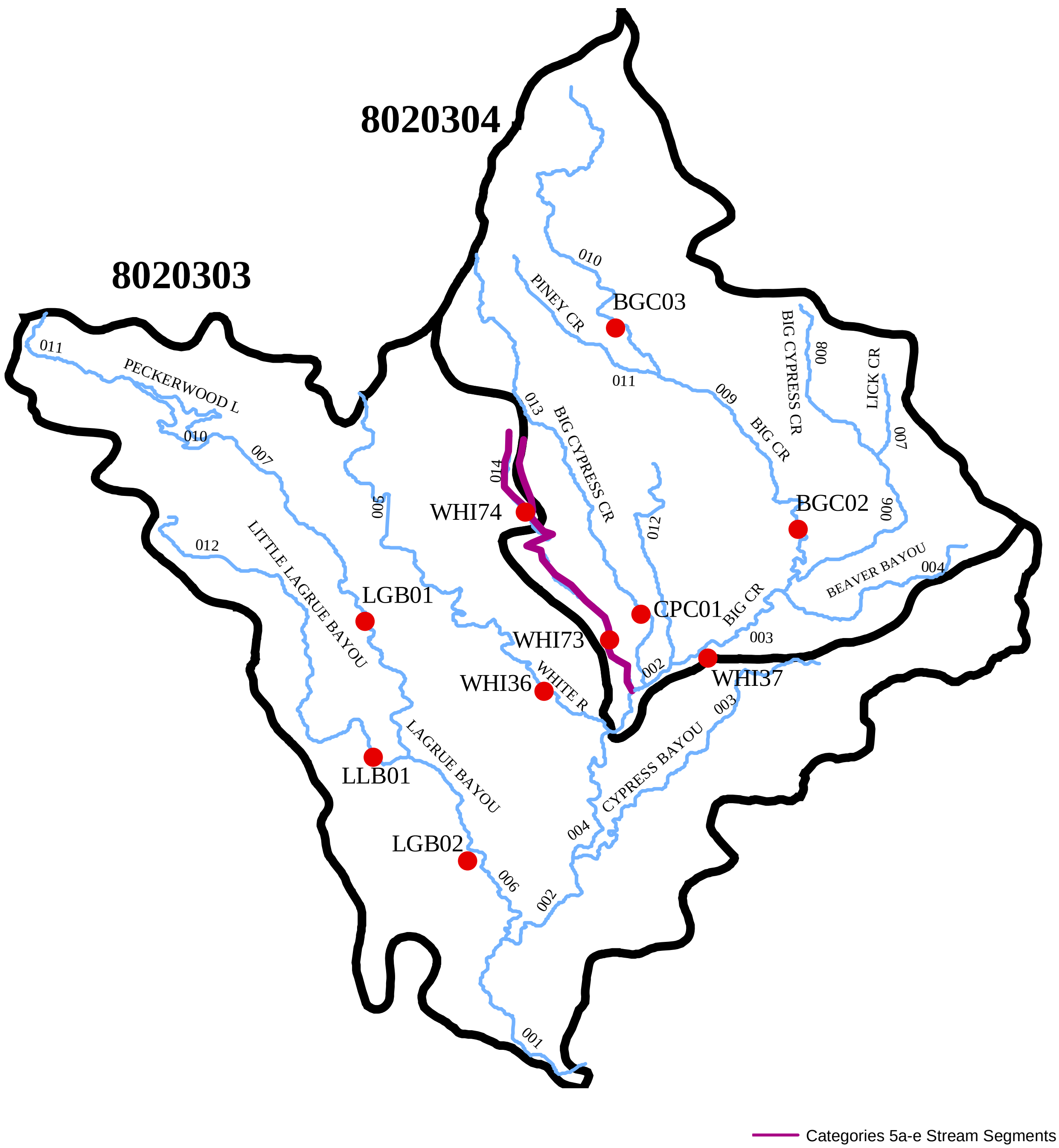
SEGMENT 4A LOWER WHITE RIVER AND TRIBUTARIES

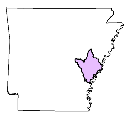
Segment 4A, located on the east central edge of Arkansas, includes most of the drainage from Monroe and Phillips Counties. It also includes parts of Arkansas, Prairie, Woodruff, St. Francis and Lee counties. This segment is drained by the lower 133-mile reach of the White River from Wattensaw Bayou to 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 44 miles were evaluated. All assessed waters were determined to be meeting designated uses.

Figure A-48: Planning Segment 4A – Monitoring Stations



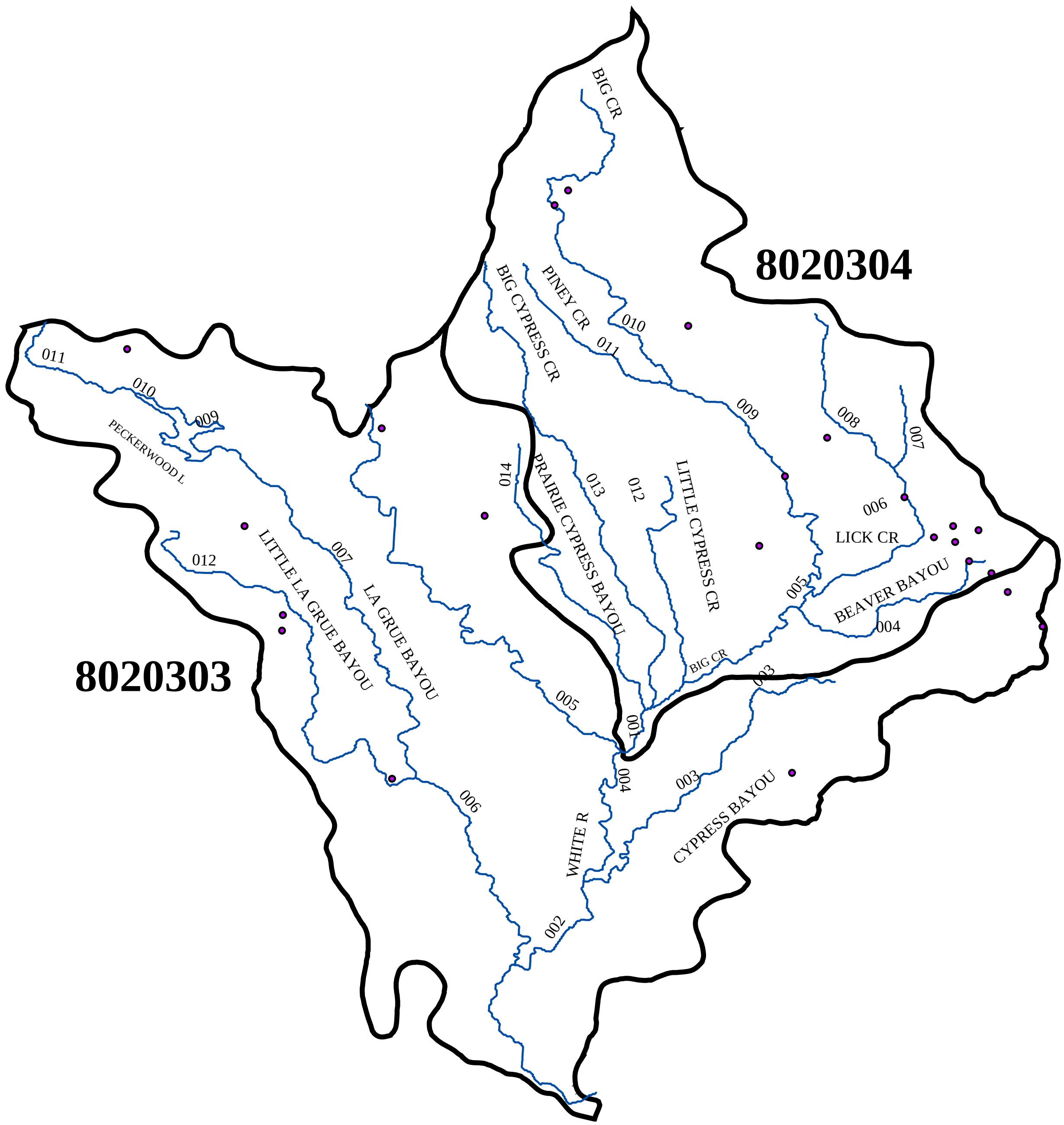


(Segment 4A)

Table A-142: Planning Segment 4A—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-4A																										
White River	8020303	-001	16.2		E	S	S	S	S	S	S									1				FISH CONSUMPTION	327.6	0
White River	8020303	-002	11.3		E	S	S	S	S	S	S									1				AQUATIC LIFE	296.5	31.1
Cypress Bayou	8020303	-003	30		U															3				PRIMARY CONTACT	327.6	0
White River	8020303	-004	14.8		E	S	S	S	S	S	S									1				SECONDARY CONTACT	327.6	0
White River	8020303	-005	46.6	WHI36	M	S	S	S	S	S	S									1				DRINKING SUPPLY	327.6	0
La Grue Bayou	8020303	-006	20.1	LGB02	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	327.6	34.3
La Grue Bayou	8020303	-007	36.1	LGB01	M	S	S	S	S	S	S									1						
La Grue Bayou	8020303	-011	11.7		U															3						
L.La Grue Bayou	8020303	-012	37	LLB01	M	S	S	S	S	S	S									1						
Big Creek	8020304	-001	4.1		U															3						
Big Creek	8020304	-002	2.7		U															3						
Big Creek	8020304	-003	12.4	WHI37	M	S	S	S	S	S	S									1						
Beaver Bayou	8020304	-004	17.4		U															3						
Big Creek	8020304	-005	1.7		E	S	S	S	S	S	S									1						
Lick Creek	8020304	-006	15.5		U															3						
Lick Creek	8020304	-007	6.8		U															3						
Big Cypress Cr.	8020304	-008	14.9		U															3						
Big Creek	8020304	-009	25.2	BGC02	M	S	S	S	S	S	S									1						
Big Creek	8020304	-010	34.3	BGC03	M	S	S	S	S	S	N	AG	AG			Cl	TDS			5d	5d					
Piney Creek	8020304	-011	14.9		U															3						
Little Cypress	8020304	-012	19.3		U															3						
Big Cypress Cr.	8020304	-013	40.8	CPC01	M	S	S	S	S	S	S									1						
Prairie Cypress	8020304	-014	26.1	WHI73	M	S	N	S	S	S	S	AG				DO				5d						
Big Creek	8020304	-015	1.2		U															3						
Boat Gunwale Slash	8020304	-914	5	WHI74	M	S	N	S	S	S	S	AG				DO				5d						
TOTAL MILES	466.1																									
MILES UNASSESSED	138.5																									
MILES EVALUATED	44																									
MILES MONITORED	283.6																									

Figure A-49: Planning Segment 4A – NPDES Permitted Facilities



(Segment 4A)

Table A-143: Segment 4A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000418	HOFFINGER INDUSTRIES	DITCH/LICK-CROOKED-BIG CRS/WHITE RB	8020304	4A
AR0021431	DEWITT, CITY OF	CONF/BIG & LITTLE LAGRUE BAYOU,WHITE R	8020303	4A
AR0021644	CLARENDON, CITY OF	WHITE R	8020303	4A
AR0022420	ELAINE, CITY OF	GOVAN SLOUGH/GAUZLEY/CYPRESSBA YOU	8020303	4A
AR0022438	HOLLY GROVE, CITY OF	DIAL CR/CUT BLUFF SL/WHITE R	8020303	4A
AR0022756	HELENA CHEMICAL CO-PHILLIPS	DITCH,LICK CR	8020304	4A
AR0034851	BAIRD MFG, INC	MILL BAYOU TRIB	8020303	4A
AR0035840	MARVELL, CITY OF	BIG CR/WHITE R	8020304	4A
AR0036315	WHEATLEY, CITY OF	FLAT FORK CR/BIG CR/WHITE R	8020304	4A
AR0038008	ULM, CITY OF	TRIB/SHERRIL CR/LAGRUE BAYOU	8020303	4A
AR0038237	MORO, CITY OF	HOG TUSK CR,BIG CR	8020304	4A
AR0038784	AUBREY, CITY OF	DITCH/TRIB/CAT CR/SPRING CR/WHITE R	8020304	4A
AR0041092	LEXA, CITY OF	LICK CR	8020304	4A
AR0041327	LAKE VIEW, CITY OF	JOHNSON BAYOU/BIG CR/WHITE R	8020304	4A
AR0042404	SOUTHLAND IMPROVEMENT DIST	CROOKED, LICK & BIG CRS/WHITE R	8020304	4A
AR0044415	U OF A RICE RESEARCH & EXT CTR	LITTLE LAGRUE BAYOU	8020303	4A
AR0045373	RONDO, CITY OF	DITCH,BIG CYPRESS CR,LICK CR	8020304	4A
AR0046469	MONSANTO AG RESEARCH	WILDCAT DITCH TRIB,LITTLE LAGRUE BAYOU	8020303	4A
AR0046752	MAPCO EXPRESS, INC-3154 WHEATLEY	TRIB, FLAT FORK CR	8020303	4A
AR0048534	P.E. BARNES & SONS, LTD	TRIB	8020304	4A
AR0048666	BROWN’S EQUIP & RENTAL-WYCAMP	TRIB,LICK CR,BIG CR,WHITE R	8020303	4A
AR0049352	USDA-AQUACULTURE RESEARCH CENT	27 ACRE RSRR,LITTLE LAGRUE BAYOU,WHITE R	8020303	4A

Table A-144: WHI0036 White River at St. Charles, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	8.47	5.80	14.78	1.69
BOD_5 (mg/L)	56	1.3	0.38	4.12	0.63
pH (standard units)	55	7.67	6.35	8.46	0.48
Total Organic Carbon (mg/L)	53	4.35	<1.0	13.90	2.09
Ammonia as N (mg/L)	58	0.02	<0.005	0.11	0.02
NO_2+NO_3 as N (mg/L)	59	0.15	<0.01	0.44	0.11
Orthophosphate as P (mg/L)	58	0.04	<0.005	0.17	0.04
Total phosphorus as P (mg/L)	54	0.11	0.048	0.35	0.06
Total hardness (mg/L)	28	116.07	23	169.00	35.83
Chloride (mg/L)	59	12.75	2.17	204.00	31.91
Sulfate (mg/L)	60	9.63	1.72	61.00	12.14
Total dissolved solids (mg/L)	45	154.86	91	299.00	32.79
Total suspended solids (mg/L)	45	44.24	1.5	217.50	38.23
Turbidity (NTU)	58	34.41	8.27	148.00	29.55

Table A-145: WHI0073 Prairie Cypress Creek at Hwy 1

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	44	5.68	1.10	9.43	2.19
BOD_5 (mg/L)	42	3.28	0.54	8.87	2.60
pH (standard units)	44	6.9	5.33	7.98	0.58
Total Organic Carbon (mg/L)	41	14.7	5.31	33.70	6.28
Ammonia as N (mg/L)	44	0.07	<0.005	0.65	0.13
NO_2+NO_3 as N (mg/L)	45	0.07	<0.01	0.43	0.11
Orthophosphate as P (mg/L)	44	0.1	0.011	0.32	0.07
Total phosphorus as P (mg/L)	42	0.28	0.038	0.81	0.21
Total hardness (mg/L)	21	46.95	13	131.00	27.87
Chloride (mg/L)	45	6.82	1.21	112.00	16.24
Sulfate (mg/L)	46	4.65	0.52	25.30	5.07
Total dissolved solids (mg/L)	33	122.36	53	410.00	65.49
Total suspended solids (mg/L)	33	14.82	<1.0	179.00	31.36
Turbidity (NTU)	44	24.17	1.4	200.00	38.54

Table A-146: WHI0074 Boat Gunwale Slash at Hwy 146

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	47	5.22	0.80	11.06	2.57
BOD_5 (mg/L)	45	1.9	0.00	5.95	1.29
pH (standard units)	46	7	5.39	8.28	0.60
Total Organic Carbon (mg/L)	44	8.75	2.64	14.50	2.36
Ammonia as N (mg/L)	47	0.03	<0.005	0.16	0.04
NO_2+NO_3 as N (mg/L)	48	0.06	<0.01	0.44	0.10
Orthophosphate as P (mg/L)	47	0.07	<0.005	0.30	0.05
Total phosphorus as P (mg/L)	44	0.16	0.049	0.93	0.14
Total hardness (mg/L)	23	82.65	15	185.00	57.63
Chloride (mg/L)	48	8.11	1.42	72.80	10.38
Sulfate (mg/L)	49	6.03	1.37	61.90	8.75
Total dissolved solids (mg/L)	36	140.15	58.5	349.00	76.73
Total suspended solids (mg/L)	36	7.13	<1.0	48.00	8.40
Turbidity (NTU)	47	13.66	1.2	69.00	19.11

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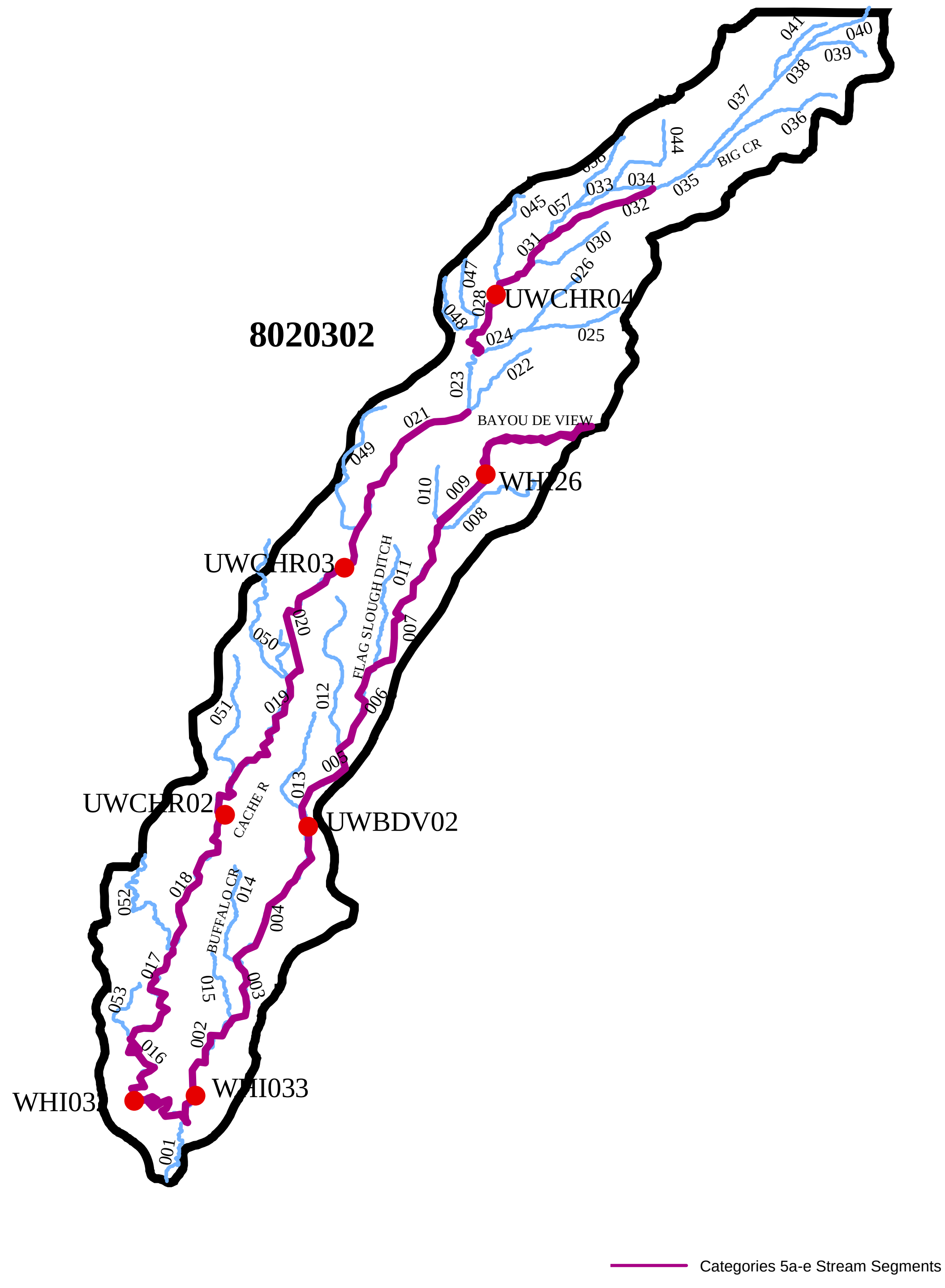
SEGMENT 4B BAYOU DEVIEW AND CACHE RIVER

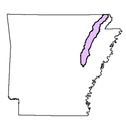
Segment 4B, located in the northeastern part of Arkansas, is a long, narrow segment that includes parts of Greene, Craighead, Poinsett, Jackson, Woodruff, Monroe, Prairie, Lawrence, and Clay counties. The segment includes Bayou DeView and Cache River and their major tributaries including Cow Ditch, Buffalo Creek and Flag Slough.

Summary of Water Quality Conditions

The 599.8 miles of streams in this segment are designated for propagation of fish and wildlife, primary and secondary contact recreation, domestic, agricultural, and industrial water supplies. None of these are designated as outstanding state or national resource waters. Water sampling stations allowed monitoring of 130.5 miles in this segment. An additional 114.6 miles of this stream were evaluated. The upper section of Bayou DeView is not meeting the aquatic life use due to high turbidity and possibly toxic metals. Downstream reaches of this stream had some elevated turbidity values, but this section of the stream was assessed as meeting all designated uses. Numerous waterbody segments are currently assessed as exceeding the in-stream turbidity standard. These are mainly the channel altered water bodies of the segment that have not been formerly identified as channel altered. The upcoming revision of Regulation No. 2, the "Regulation Establishing Water Quality Standards For Surface Waters Of The State Of Arkansas" in 2004 will formerly designate these streams as channel altered. All other waters in this segment were meeting designated uses.

Figure A-50: Planning Segment 4B – Monitoring Stations





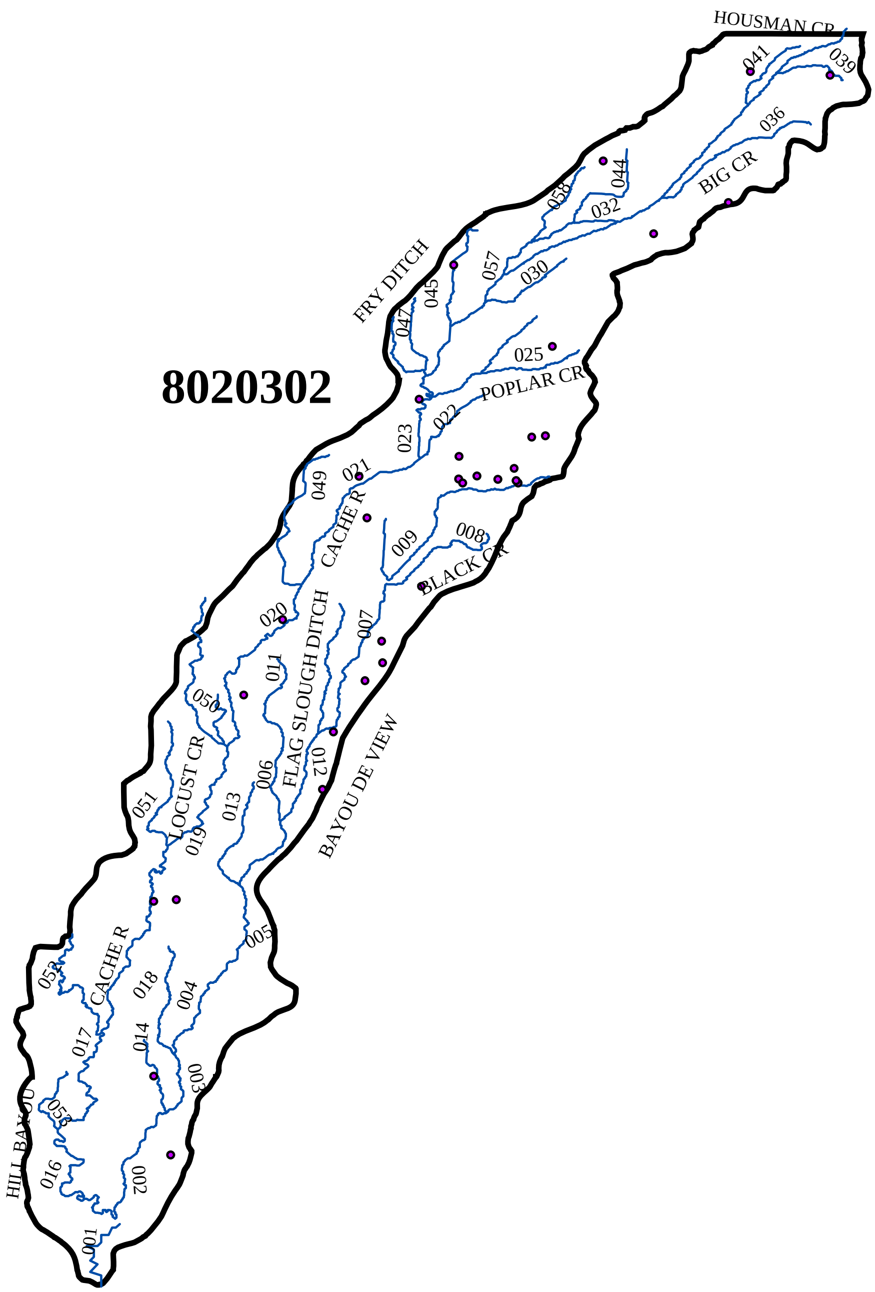
(Segment 4B)

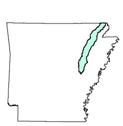
Table A-147: Planning Segment 4B—Designated Use Attainment Status

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-4B																										
Cache River	8020302	-001	8.6		U															3				FISH CONSUMPTION	245.1	0
Bayou DeView	8020302	-002	13.7	WHI33	M	S	S	N	S	S	S	AG				PA				5b				AQUATIC LIFE	20.8	224.3
Bayou DeView	8020302	-003	7.1		E	S	S	N	S	S	S	AG				PA				5b				PRIMARY CONTACT	186.7	58.4
Bayou DeView	8020302	-004	21.2	BDV02	M	S	N	S	S	S	S	AG				SI				5b				SECONDARY CONTACT	245.1	0
Bayou DeView	8020302	-005	8.6		E	S	N	S	S	S	S	AG				SI				5b				DRINKING SUPPLY	245.1	0
Bayou DeView	8020302	-006	10.2		E	S	N	S	S	S	S	AG				SI				5b				AGRI & INDUSTRY	224.8	20.3
Bayou DeView	8020302	-007	18.2		E	S	N	S	S	S	S	AG				SI				5b						
Bayou DeView	8020302	-009	20.3	WHI26	M	S	N	S	S	S	N	AG	AG	MP	MP	SI	TDS	CL	ME*	5b	5e	5e	5a			
Black Creek	8020302	-008	13		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	WHI32	M	S	N	N	S	S	S	AG	AG			SI	PA			5b	5b					
Cache River	8020302	-017	15.8		E	S	N	N	S	S	S	AG	AG			SI	PA			5b	5b					
Cache River	8020302	-018	25	CHR02	M	S	N	S	S	S	S	AG				SI				5b						
Cache River	8020302	-019	13.7		E	S	N	S	S	S	S	AG				SI				5b						
Cache River	8020302	-020	22.6	CHR03	M	S	N	S	S	S	S	AG	AG			SI	Pb			5b	5d					
Cache River	8020302	-021	18.4		E	S	N	S	S	S	S	AG	AG			SI	Pb			5b	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			SI	Pb			5b	5d					
Cache River	8020302	-028	5.9	CHR04	M	S	N	S	S	S	S	AG	AG			SI	Pb			5b	5d					
Cache River	8020302	-029	3.9		E	S	N	S	S	S	S	AG	AG			SI	Pb			5b	5d					
Swan Ditch	8020302	-030	9.1		U															3						
Cache River	8020302	-031	3.4		E	S	N	S	S	S	S	AG	AG			SI	Pb			5b	5d					
Cache River	8020302	-032	11.4		E	S	N	S	S	S	S	AG	AG			SI	Pb			5b	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		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	599.8																									
MILES UNASSESSED	354.7																									
MILES EVALUATED	114.6																									
MILES MONITORED	130.5																									

ME* Metals include AL, Cu, Pb, and Zn.

Figure A-51: Planning Segment 4B – NPDES Permitted Facilities





(Segment 4B)

Table A-148: Segment 4B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000175	GEN ELECTRIC CO-JONESBORO	CHRISTIAN CR/LOST CR...CACHE R	8020302	4B
AR0020354	WEINER, CITY OF	BAYOU DEVIEW TRIB	8020302	4B
AR0020699	BONO, CITY OF	TRIB/WHALEY SLOUGH DT/CACHE R	8020302	4B
AR0021890	BRINKLEY, CITY OF	CANEY SLASH/BAYOU DEVIEW	8020302	4B
AR0022446	FISHER, CITY OF	TRIB/BAYOU DEVIEW	8020302	4B
AR0033391	COTTON PLANT, CITY OF	TURKEY CR,DITCH,BAYOU DEVIEW,CACHE R	8020302	4B
AR0034614	GRUBBS, TOWN OF	CACHE R	8020302	4B
AR0035947	AR PARKS & TOURISM-CROWLEY’S	DITCH,BIG DITCH,CACHE,WHITE R	8020302	4B
AR0037834	ADM-RICELAND PARTNERSHIP-WALDE	DITCH,BAYOU DEVIEW	8020302	4B
AR0037907	JONESBORO CITY WATER & LIGHT-W	BIG CR TRIB,DEVIEW BAYOU TRIB	8020302	4B
AR0038351	ADM-RICELAND PARTNERSHIP-OTWEL	TRIB,BIG CR LTRL #1	8020302	4B
AR0041629	WESTSIDE CONSOL SCHOOL DIST #5	TRIB,BIG CR DITCH,BAYOU DEVIEW,CACHE R	8020302	4B
AR0042188	NORTHERN MHP	TRIB,BIG CR,CACHE R	8020302	4B
AR0042552	TRI-COUNTY SAND & GRAVEL, INC	DORT CR, CACHE R DITCH #10, CACHE R	8020302	4B
AR0042781	MCDOUGAL, CITY OF	LITTLE CACHE R TRIB,WHITE R	8020302	4B
AR0043290	KNOBEL, TOWN OF	TRIB/CACHE R	8020302	4B
AR0043443	SEDGWICK, CITY OF	WEST CACHE R DITCH/CACHE R	8020302	4B
AR0043486	TRI-CITY UTILITIES, INC	TRIB, BEAVER DAM DITCH	8020302	4B
AR0043524	EGYPT, CITY OF	CACHE R/WHITE R	8020302	4B
AR0043605	WALDENBURG, CITY OF	TRIB/BAYOU DEVIEW/CACHE R	8020302	4B
AR0044211	OLIVETAN BENEDICTINE SISTERS,	TRIB/LOST CR/BIG CR DITCH	8020302	4B
AR0044954	MCCRORY, CITY OF	CACHE R/WHITE R	8020302	4B
AR0045284	CASH, CITY OF	TRIB/CACHE R	8020302	4B
AR0045489	POLLARD, CITY OF	POLLARD CR,DITCH #2,DITCH #1	8020302	4B
AR0046604	AMAGON, CITY OF	CACHE R TRIB,WHITE R	8020302	4B
AR0046981	HEDGER AGGREGATE, INC.	TRIB-MUD CR/BIG&LOST CR DITCH	8020302	4B
AR0047589	BISCOE, CITY OF	WHITE R	8020302	4B

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0048208	BEST PETROLEUM PLUS, INC	DAVIS BRANCH	8020302	4B
AR0048402	LMJ TRAILER PARK	BIG CR DITCH TRIB,WHITE R	8020302	4B
AR0048771	WILLIAMS MHP	LOST CR TRIB	8020302	4B
AR0048909	LAFE, CITY OF	BIG CR	8020302	4B

Table A-149: WHI0026 Bayou DeView W. of Gibson, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	7.22	3.94	12.20	2.02
BOD_5 (mg/L)	52	2.79	0.21	6.63	1.31
pH (standard units)	56	7.4	6.22	8.97	0.61
Total Organic Carbon (mg/L)	51	8.04	1.26	15.50	2.60
Ammonia as N (mg/L)	56	0.1	<0.005	1.10	0.18
NO_2+NO_3 as N (mg/L)	55	1.09	0.046	3.30	0.79
Orthophosphate as P (mg/L)	56	1.15	0.013	5.38	1.18
Total phosphorus as P (mg/L)	50	1.3	0.01	5.34	1.18
Total hardness (mg/L)	29	87.87	19	320.00	84.15
Chloride (mg/L)	57	19.58	2.35	62.68	13.76
Sulfate (mg/L)	57	13.76	3.8	32.61	6.73
Total dissolved solids (mg/L)	43	208.05	118	421.00	80.14
Total suspended solids (mg/L)	40	46.25	1	441.00	86.97
Turbidity (NTU)	56	55.14	1.1	310.00	65.03

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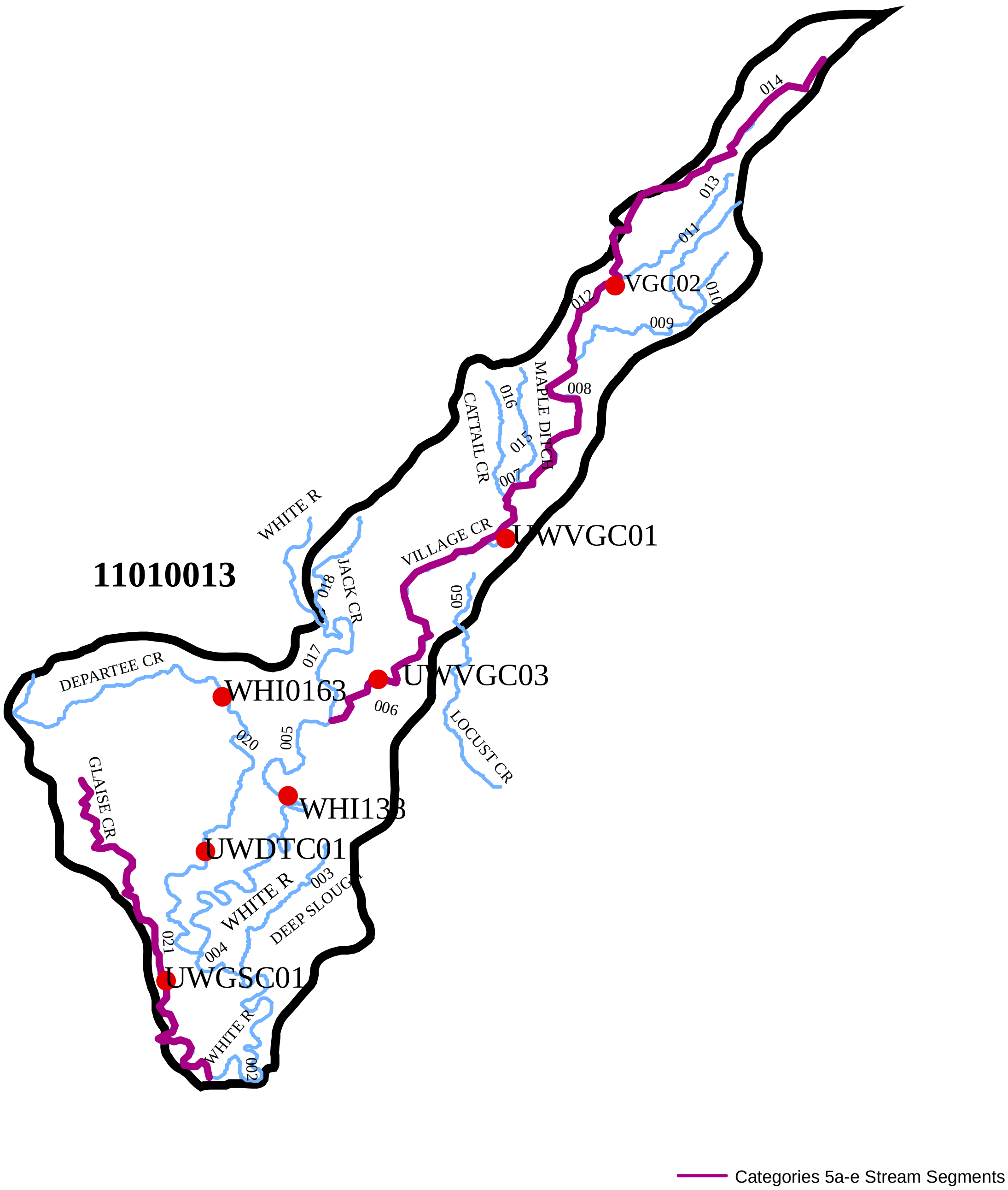
SEGMENT 4C VILLAGE CREEK AND TRIBUTARIES

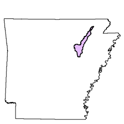
Segment 4C includes portions of Lawrence, Jackson, Woodruff and White counties. This segment includes Village Creek and its tributaries and a segment of the White River and its tributaries of Departee and Glaise Creeks.

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. All assessed stream segments were meeting designated uses. However, numerous waterbody segments are currently assessed as exceeding the in-stream turbidity standard. These are mainly the channel altered water bodies of the segment that have not been formerly identified as channel altered. The upcoming revision of Regulation No. 2, the “Regulation Establishing Water Quality Standards For Surface Waters Of The State Of Arkansas” in 2004 will formerly designate these streams as channel altered. All other waters in this segment were meeting designated uses.

Figure A-52: Planning Segment 4C – Monitoring Stations



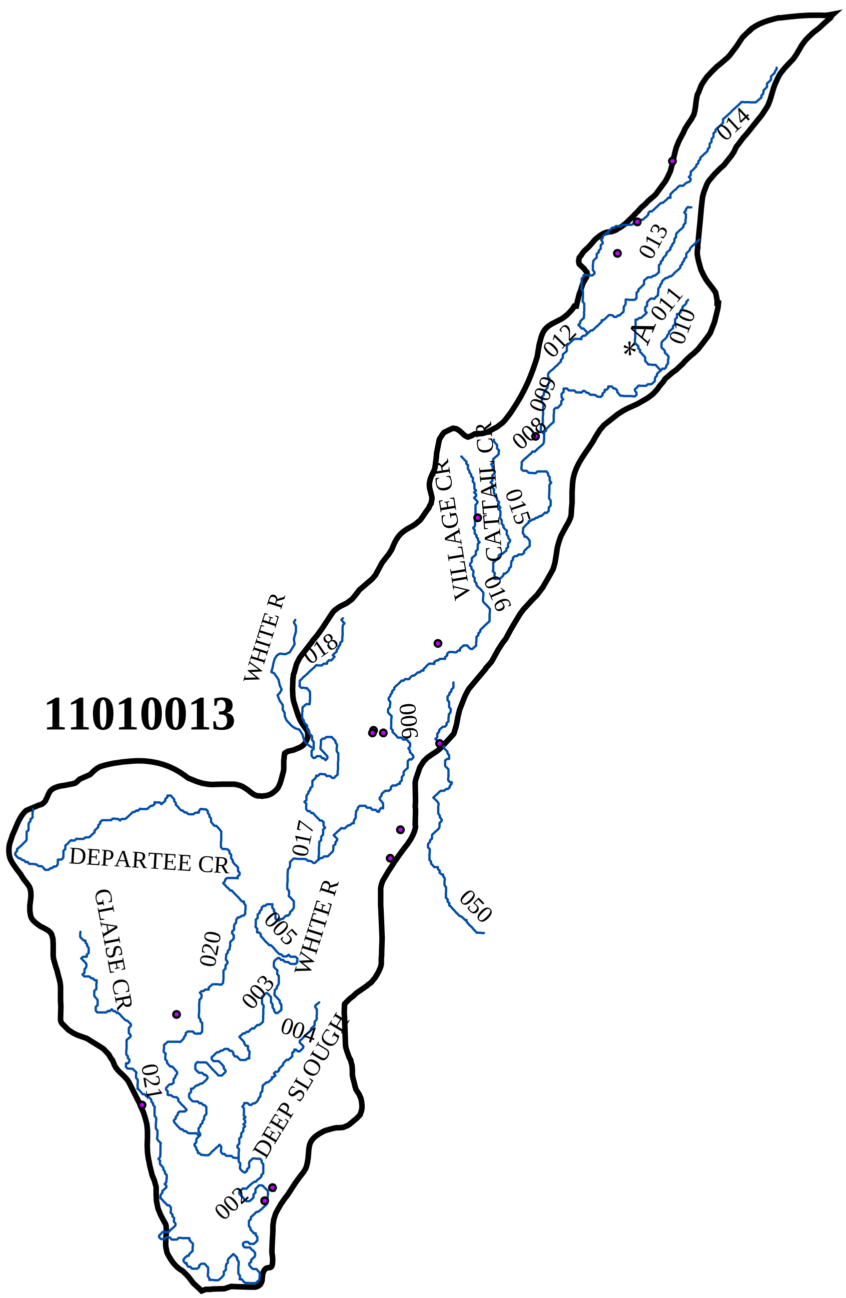


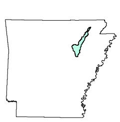
(Segment 4C)

Table A-150: Planning Segment 4C—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-4C																										
White River	11010013	-001	0.8		E	S	S	S	S	S	S									1				FISH CONSUMPTION	208.5	0
White River	11010013	-002	20.8		E	S	S	S	S	S	S									1				AQUATIC LIFE	138.9	69.6
Deep Slough	11010013	-003	12.7		U															3				PRIMARY CONTACT	178.4	30.1
White River	11010013	-004	4.4		E	S	S	S	S	S	S									1				SECONDARY CONTACT	208.5	0
White River	11010013	-005	36.7	WHI138	M	S	S	S	S	S	S									1				DRINKING SUPPLY	208.5	0
Village Cr	11010013	-006	25.2	VGC01&3	M	S	N	S	S	S	S	AG	AG			SI	DO			5b	5d			AGRI & INDUSTRY	208.5	0
Village Cr	11010013	-007	1.2		E	S	N	S	S	S	S	AG	AG			SI	DO			5b	5d					
Village Cr	11010013	-008	13		E	S	N	S	S	S	S	AG	AG			SI	DO			5b	5d					
Lick Pond Slough	11010013	-009	10.9		U															3						
Lick Pond Slough	11010013	-011	10.4		U															3						
Village Cr	11010013	-012	7.4	VGC02	M	S	N	S	S	S	S	AG				SI				5b						
Village Cr	11010013	-014	22.8		E	S	N	S	S	S	S	AG				SI				5b						
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	DTC01	M	S	S	S	S	S	S									1						
Glaise Creek	11010013	-021	30.1	GSC01	M	S	S	N	S	S	S	AG				PA				5b						
TOTAL MILES	285																									
MILES UNASSESSED	76.5																									
MILES EVALUATED	63																									
MILES MONITORED	145.5																									

Figure A-53: Planning Segment 4C – NPDES Permitted Facilities





(Segment 4C)

Table A-151: Segment 4C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000400	ARKANSAS ELECTRIC COOP-BAILEY	WHITE R	11010013	4C
AR0001481	NORANDAL USA, INC	DITCH,VILLAGE CR	11010013	4C
AR0020001	TUCKERMAN, CITY OF	TUCKERMAN DITCH/VILLAGE CR	11010013	4C
AR0020141	HOXIE, CITY OF	TRIB/TURKEY CR	11010013	4C
AR0022136	BRADFORD, CITY OF	BUTTER CK,DEPARTEE CR,WHITE R	11010013	4C
AR0022217	RUSSELL, CITY OF	GRAISE CR,WHITE R	11010013	4C
AR0034550	ARKANSAS STEEL ASSOC	VILLAGE CR TRIB	11010013	4C
AR0034738	AUGUSTA, CITY OF	WHITE R	11010013	4C
AR0034860	SWIFTON, CITY OF	CATTAIL CR/VILLAGE CR	11010013	4C
AR0036668	FRIT INDUSTRIES, INC-WALNUT RI	TRIB,COON CR,VILLAGE CR,WHITE R	11010013	4C
AR0037044	NEWPORT, CITY OF-HWY 14	VILLAGE CR	11010013	4C
AR0039675	ALICIA, CITY OF	BLACK SPICE DITCH	11010013	4C
AR0039837	PATTERSON, CITY OF	CACHE R	11010013	4C
AR0041033	DIAZ, CITY OF-WWTP	DITCH,VILLAGE CR,WHITE R	11010013	4C
AR0045225	NEWPORT, CITY OF-AIRPORT/IND	TRIB/LOCUST CR,VILLAGE CR	11010013	4C
AR0046566	WALNUT RIDGE, CITY OF	VILLAGE CR/WHITE R	11010013	4C
AR0049441	CSO LLC	MAYBERRY SLOUGH TRIB	11010013	4C

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)	51	8.16	4.71	12.60	2.06
BOD_5 (mg/L)	53	0.82	0.07	2.37	0.45
pH (standard units)	46	7.82	6.43	8.29	0.32
Total Organic Carbon (mg/L)	50	3.38	1.48	27.00	3.64
Ammonia as N (mg/L)	56	0.01	<0.005	0.10	0.02
NO_2+NO_3 as N (mg/L)	56	0.22	<0.01	0.58	0.12
Orthophosphate as P (mg/L)	56	0.02	<0.005	0.08	0.02
Total phosphorus as P (mg/L)	50	0.07	0.01	0.24	0.05
Total hardness (mg/L)	29	135.07	17	176.00	38.25
Chloride (mg/L)	56	4.57	0.41	6.87	1.42
Sulfate (mg/L)	55	6.4	0.88	9.07	1.25
Total dissolved solids (mg/L)	45	167.03	129	200.00	17.95
Total suspended solids (mg/L)	44	25.3	7.5	96.00	21.66
Turbidity (NTU)	55	19.44	1.8	136.00	22.08

SEGMENT 4D WHITE RIVER, WATTENSAW BAYOU, AND BAYOU DES ARC

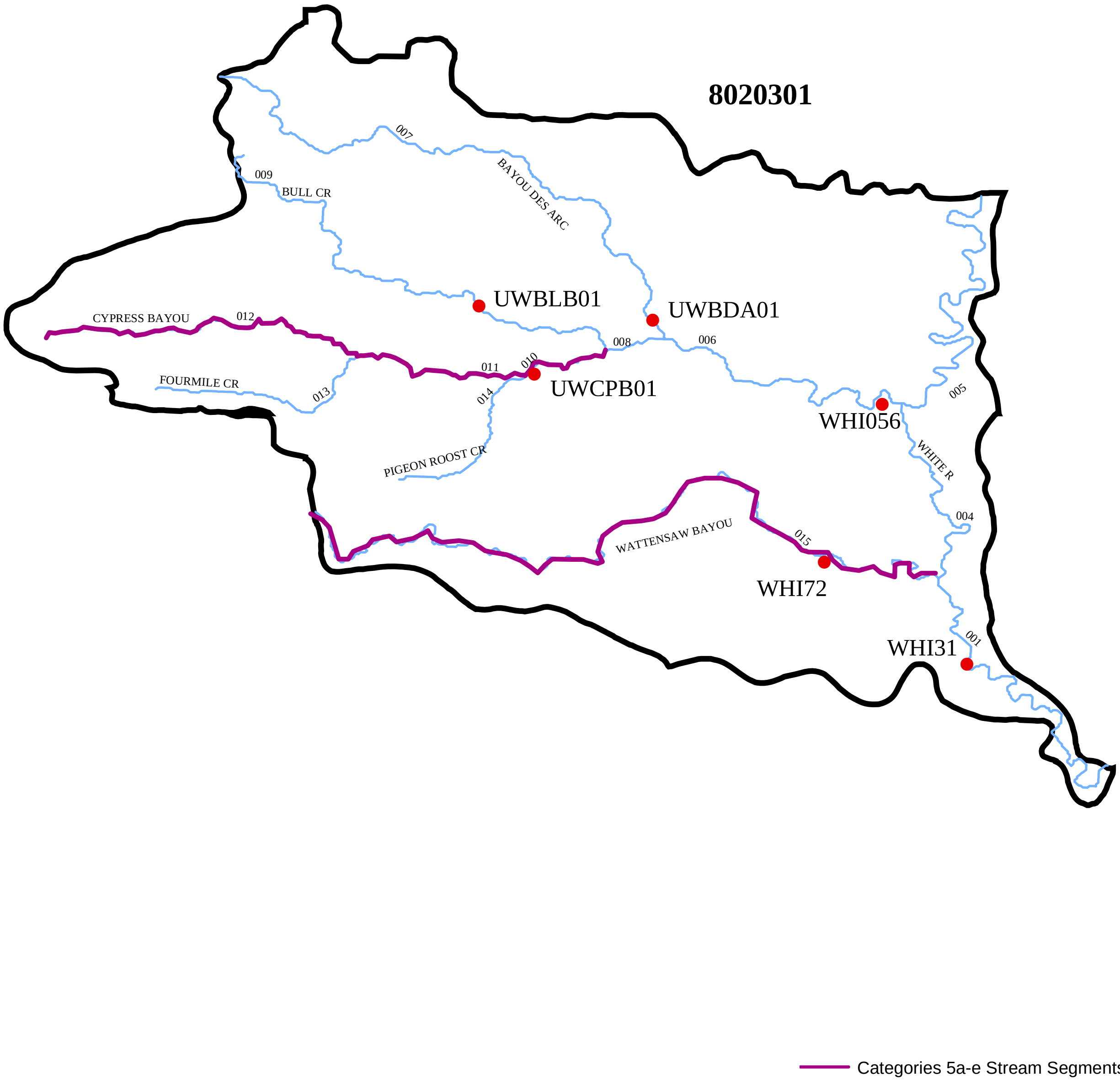
Segment 4D includes portions of White, Prairie, Lonoke, and Faulkner Counties in central Arkansas. The segment encompasses a 67-mile stretch of the White River and Wattensaw and Des Arc Bayous, which are tributary to it.

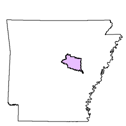
Summary of Water Quality Conditions

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 stream. An additional 70 miles were evaluated. All waters within this segment were evaluated as meeting all designated uses.

Several waterbody segments are currently assessed as exceeding the in-stream bacteria standard. The upcoming revision of Regulation No. 2, the “Regulation Establishing Water Quality Standards For Surface Waters Of The State Of Arkansas” in 2004, will establish the use of *E. coli* bacteria for the assessment of primary contact recreation. It is anticipated that this will change the assessment of these waterbodies to fully supporting. All other waters in this segment were meeting designated uses.

Figure A-54: Planning Segment 4D – Monitoring Stations



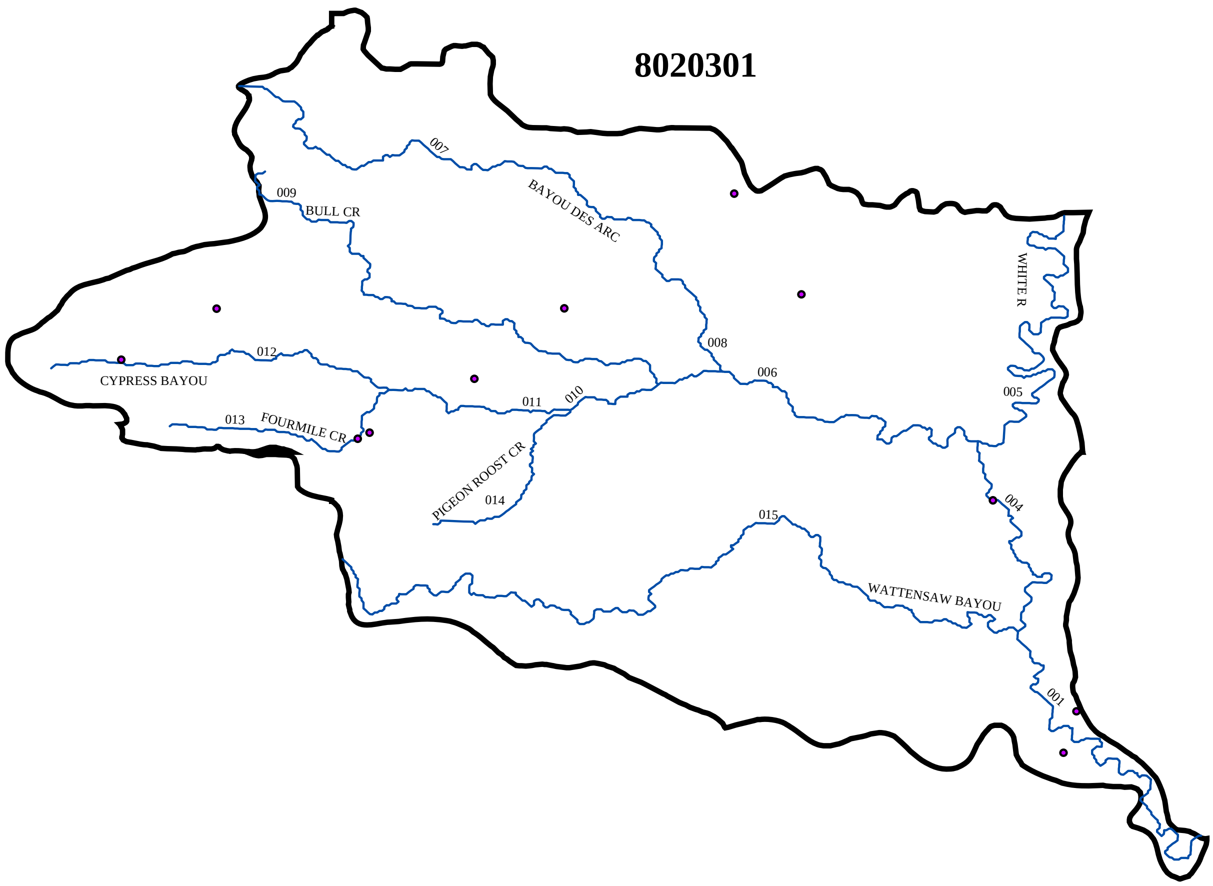


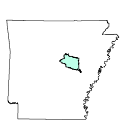
(Segment 4D)

Table A-153: Planning Segment 4D—Designated Use Attainment Status

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-4D																				1						
White River	8020301	-001	24.3	WHI31	M	S	S	S	S	S	S									1				FISH CONSUMPTION	230.7	0
White River	8020301	-004	14.8		E	S	S	S	S	S	S									1				AQUATIC LIFE	182.5	48.2
White River	8020301	-005	28.2		E	S	S	S	S	S	S									1				PRIMARY CONTACT	198.7	32
Bayou Des Arc	8020301	-006	17.8	WHI56	M	S	S	S	S	S	S									1				SECONDARY CONTACT	230.7	0
Bayou Des Arc	8020301	-007	36.4	BDA01	M	S	S	S	S	S	S									1				DRINKING SUPPLY	230.7	0
Cypress Bayou	8020301	-008	3.2		U															3				AGRI & INDUSTRY	230.7	0
Bull Bayou	8020301	-009	29	BLB01	M	S	S	S	S	S	S									1						
Cypress Bayou	8020301	-010	5	CPB01	M	S	S	N	S	S	S	AG				PA				5b						
Cypress Bayou	8020301	-011	9.5		E	S	S	N	S	S	S	AG				PA				5b						
Cypress Bayou	8020301	-012	17.5		E	S	S	N	S	S	S	AG				PA				5b						
Fourmile Creek	8020301	-013	12.8		U															3						
Pidgeon Roost	8020301	-014	11		U															3						
Wattensaw Bayou	8020301	-015	48.2	WHI72	M	S	N	S	S	S	S	UN				DO				5d						
TOTAL MILES	257.7																									
MILES UNASSESSED	27																									
MILES EVALUATED	70																									
MILES MONITORED	160.7																									

Figure A-55: Planning Segment 4D – NPDES Permitted Facilities





(Segment 4D)

Table A-154: Segment 4D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0021504	MCRAE, CITY OF	DRY BRANCH CR, CANE CR, BAYOU DES ARC	8020301	4D
AR0022101	BEEBE, CITY OF	CYPRESS BAYOU/BAYOU DES ARC/WHITE R	8020301	4D
AR0022225	DES ARC, CITY OF	WHITE R	8020301	4D
AR0022411	HAZEN, CITY OF	LITTLE HURRICANE CR	8020301	4D
AR0035611	DEVALLS BLUFF, CITY OF	DITCH/WHITE R	8020301	4D
AR0038369	AUSTIN, CITY OF	FOUR MILE CR,BAYOU DES ARC,WHITE R	8020301	4D
AR0042803	GRIFFITHVILLE, CITY OF	TRIB,DOGWOOD CR,BAYOU DESARC CR	8020301	4D
AR0044822	HIGGINSON, CITY OF	GUM SPRINGS CR,GLADE CR,BAYOU DES ARC	8020301	4D
AR0047121	VILONIA, CITY OF	CYPRESS BAYOU	8020301	4D
AR0047554	WARD, CITY OF	4-MILE CR/CYPRESS&DES ARC BAYOU	8020301	4D
AR0049301	RIVER CITY ENERGY CO-TEXACO MA	DITCH,LITTLE CYRESS CR TRIB,CYPRESS BAYOU	8020301	4D

Table A-155: WHI0031 White River at DeValls Bluff, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	9.27	3.60	14.31	1.94
BOD_5 (mg/L)	55	1.11	0.25	2.38	0.46
pH (standard units)	57	7.54	6.39	8.44	0.34
Total Organic Carbon (mg/L)	53	3.47	<1.0	9.60	1.52
Ammonia as N (mg/L)	59	0.01	<0.005	0.15	0.02
NO_2+NO_3 as N (mg/L)	60	0.18	<0.01	0.65	0.13
Orthophosphate as P (mg/L)	59	0.02	<0.005	0.10	0.02
Total phosphorus as P (mg/L)	55	0.08	0.01	0.37	0.05
Total hardness (mg/L)	30	123.7	54	183.00	29.14
Chloride (mg/L)	58	5.2	2.66	13.12	1.83
Sulfate (mg/L)	59	11.7	4.81	145.04	23.94
Total dissolved solids (mg/L)	47	156.34	62	336.50	44.94
Total suspended solids (mg/L)	46	40.17	1	143.30	25.05
Turbidity (NTU)	58	27.56	3.2	86.70	19.35

Table A-156: WHI0072 Wattensaw Bayou N. of Hazen, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	18.46	2.07	687.00	90.17
BOD_5 (mg/L)	55	2.73	0.87	6.56	1.34
pH (standard units)	58	7.09	6.41	7.57	0.26
Total Organic Carbon (mg/L)	53	10.86	6.73	16.80	2.22
Ammonia as N (mg/L)	59	0.07	<0.005	0.61	0.12
NO_2+NO_3 as N (mg/L)	60	0.14	<0.01	0.53	0.12
Orthophosphate as P (mg/L)	59	0.08	0.019	0.14	0.03
Total phosphorus as P (mg/L)	55	0.2	0.08	1.11	0.14
Total hardness (mg/L)	30	86.83	21	202.00	43.68
Chloride (mg/L)	58	25.42	3.12	81.72	17.20
Sulfate (mg/L)	59	7.37	1.81	20.47	3.85
Total dissolved solids (mg/L)	47	183.7	61.5	351.00	74.21
Total suspended solids (mg/L)	46	14.43	2.5	104.30	17.11
Turbidity (NTU)	58	20.99	2.4	130.00	22.53

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, Big Creek, Devil's Fork and Archey Creek.

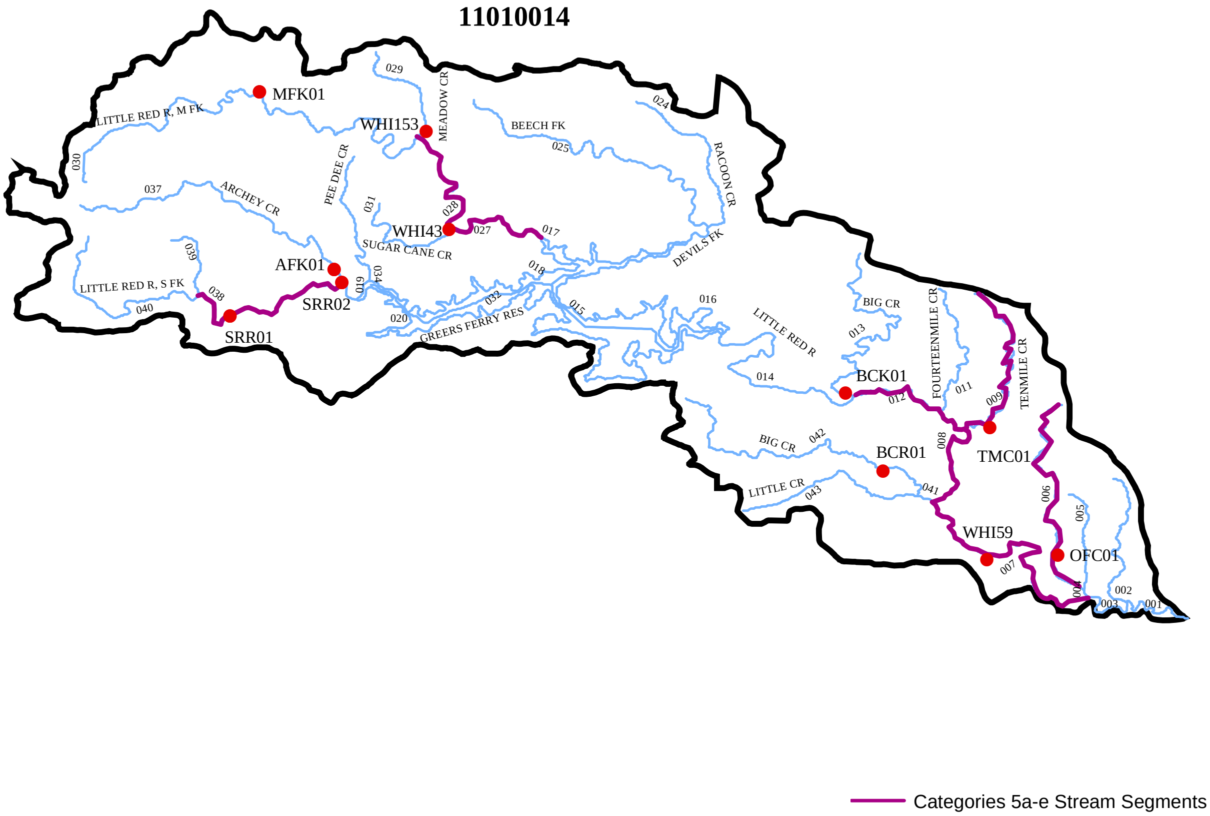
Summary of Water Quality Conditions

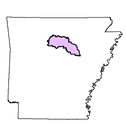
The designated uses of waters within this segment include propagation of fish and wildlife, primary and secondary contact recreation, domestic, agricultural, and industrial water supply. Additionally, 158.1 miles, approximately one-third of the stream miles, are designated as outstanding state or national resource waters. Monitoring stations allowed for use support assessment of 223.4 miles. An additional 88.4 stream miles were evaluated bring the total stream miles assessed in this segment to 311.8. 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. All other waters assessed were supporting all designated uses.

Several stream segments on the Little Red River and the Middle Fork of the Little Red River were assessed as not attaining the primary contact recreation use because of high bacteria concentrations. In addition, 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. Currently, the sources of these impairments in unknown.

Several waterbody segments are currently assessed as exceeding the in-stream bacteria standard. The upcoming revision of Regulation No. 2, the "Regulation Establishing Water Quality Standards For Surface Waters Of The State Of Arkansas" in 2004, will establish the use of *E. coli* bacteria for the assessment of primary contact recreation. It is anticipated that this will change the assessment of these waterbodies to fully supporting. All other waters in this segment were meeting designated uses.

Figure A-56: Planning Segment 4E – Monitoring Stations



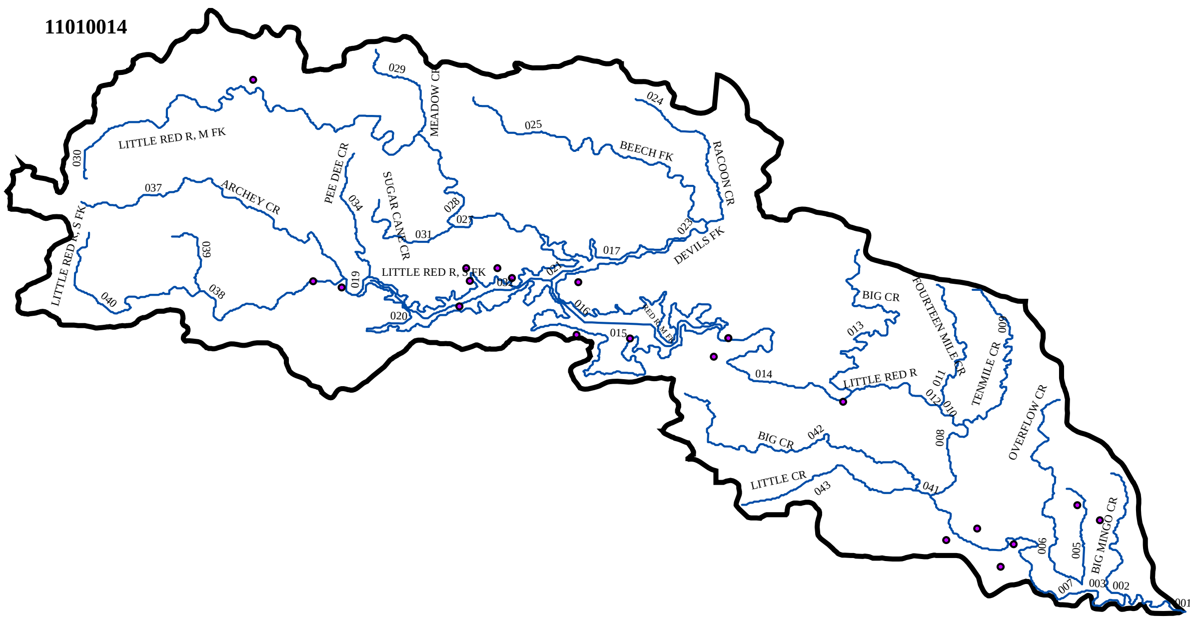


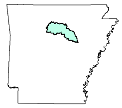
(Segment 4E)

Table A-157: Planning Segment 4E—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-4E																										
Little Red R.	11010014	-001	7.5		U															3				FISH CONSUMPTION	311.8	0
Big Mingo Cr.	11010014	-002	14.4		U															3				AQUATIC LIFE	250.1	61.7
Little Red R.	11010014	-003	5.4		U															3				PRIMARY CONTACT	212.7	99.1
Overflow Creek	11010014	-004	0.6		E	S	N	N	S	S	S	AG	AG			PA	SI			5b	5b			SECONDARY CONTACT	311.8	0
Unnamed	11010014	-005	9.5		U															3				DRINKING SUPPLY	311.8	0
Overflow Cr.	11010014	-006	21.7	OFC01	M	S	N	N	S	S	S	AG	AG			PA	SI			5b	5b			AGRI & INDUSTRY	311.8	0
Little Red R.	11010014	-007	21.4	WHI59	M	S	S	N	S	S	S	UN				PA				5b						
Little Red R.	11010014	-008	9		E	S	S	N	S	S	S	UN				PA				5b						
Ten Mile Creek	11010014	-009	18.6	TMC01	M	S	N	S	S	S	S	UN	UN			SI	PA			5b	5b					
Little Red R.	11010014	-010	2.9		E	S	S	N	S	S	S	UN				PA				5b						
Fourteen Mile	11010014	-011	13.9		U															3						
Little Red R.	11010014	-012	8		E	S	S	N	S	S	S	UN				PA				5b						
Big Creek	11010014	-013	26.9	BCK01	M	S	S	S	S	S	S									1						
Little Red R.	11010014	-014	22		E	S	S	S	S	S	S									1						
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	WHI43	M	S	N	N	S	S	S	UN	UN			PA	DO			5d	5d					
Middle Fork	11010014	-028	12		E	S	N	N	S	S	S	UN	UN			PA	DO			5d	5d					
Middle Fork	11010014	-030	44.2	MFK01	M	S	S	S	S	S	S									1						
Meadow Creek	11010014	-029	10.3	WHI153	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	AFK01	M	S	S	S	S	S	S									1						
South Fork	11010014	-036	2		E	S	S	S	S	S	S									1						
South Fork	11010014	-038	14.7	SRR01&2	M	S	S	N	S	S	S	UN				PA				5b						
Opossum Walk	11010014	-039	7		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	BCR01	M	S	S	S	S	S	S									1						
Little Creek	11010014	-043	15		E	S	S	S	S	S	S									1						
TOTAL MILES	440.2																									
MILES UNASSESSED	128.4																									
MILES EVALUATED	90.4																									
MILES MONITORED	221.4																									

Figure A-57: Planning Segment 4E – NPDES Permitted Facilities





(Segment 4E)

Table A-158: Segment 4E Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0021601	SEARCY, CITY OF	LITTLE RED R	11010014	4E
AR0022322	KENSETT, CITY OF	BLACK CR,LITTLE RED R	11010014	4E
AR0022381	HEBER SPRINGS, CITY OF	LITTLE RED R	11010014	4E
AR0024066	EDEN ISLE CORP	GREERS FERRY LAKE/L' RED R	11010014	4E
AR0029181	USDIFWS-GREERS FERRY NATL FISH	LITTLE RED R	11010014	4E
AR0034401	FAIRFIELD BAY-DAVE CREEK WWTP	DAVE CR,GREERS FERRY LAKE	11010014	4E
AR0034428	FAIRFIELD BAY-HIDDEN VALLEY	TRIB,LYNN CR,GREERS FERRY LAKE	11010014	4E
AR0034509	USDIFWS-GREERS FERRY NATL FISH	LITTLE RED R	11010014	4E
AR0034657	LESLIE, CITY OF	COVE CR	11010014	4E
AR0035742	JUDSONIA, CITY OF	LITTLE RED R	11010014	4E
AR0035807	BALD KNOB, CITY OF	BIG MINGO CR,LITTLE RED R	11010014	4E
AR0037303	FAIRFIELD BAY-HAMILTON HILLS	TRIB,LYNN CR,GREERS FERRY LAKE	11010014	4E
AR0039233	PANGBURN, CITY OF	LITTLE RED R	11010014	4E
AR0042714	ARKANSAS GENERAL INDUSTRIES	DITCH,GUM CR,LITTLE RED R,WHITE R	11010014	4E
AR0043460	FAIRFIELD BAY-HOOTEN HOLLOW	HOOTEN HOLLOW/GREERS FERRY LAKE	11010014	4E
AR0043940	WEST SIDE SCHOOL DIST #4	TRIB/GREERS FERRY LAKE	11010014	4E
AR0044580	FAIRFIELD BAY-LYNN CREEK WWTP	LYNN CR, GREERS FERRY LAKE	11010014	4E
AR0044920	DIAMOND BLUFF ESTATES	EAST WILDCAT HOLLOW/GREERS FERRY/WHITE	11010014	4E
AR0046078	FAIRFIELD BAY-GRAND ISLE	HOOTEN HOLLOW CR,GREERS FERRY LAKE	11010014	4E
AR0048747	CLINTON, CITY OF-WEST WWTP	TRIB,SOUTH FORK LITTLE RED R,GREERS FERRY LAKE	11010014	4E
AR0048836	CLINTON, CITY OF-EAST WWTP	TRIB,SOUTH FORK LITTLE RED R,GREERS FERRY LAKE	11010014	4E
AR0049301	VULCAN MATERIALS CO-JUDSONIA	TRIB,ALDER CR,LITTLE RED R	11010014	4E

Table A-159: WHI0043 Middle Fork Little Red River Near Shirley

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	7.56	4.10	17.40	2.45
BOD_5 (mg/L)	56	0.9	0.00	3.32	0.77
pH (standard units)	54	7.17	6.26	9.50	0.51
Total Organic Carbon (mg/L)	54	2.7	1.2	5.23	0.95
Ammonia as N (mg/L)	58	0.01	<0.005	0.08	0.02
NO_2+NO_3 as N (mg/L)	59	0.08	<0.01	0.58	0.13
Orthophosphate as P (mg/L)	58	0.01	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	54	0.04	0.01	0.14	0.03
Total hardness (mg/L)	29	40.45	21	114.00	16.37
Chloride (mg/L)	59	2.38	1.54	5.17	0.64
Sulfate (mg/L)	58	5.74	2.64	14.90	2.29
Total dissolved solids (mg/L)	46	59.29	43	91.00	11.14
Total suspended solids (mg/L)	45	5.81	<1.0	25.00	4.67
Turbidity (NTU)	57	6.89	1.7	25.00	4.89

Table A-160: WHI0059 Little Red River Downstream of Searcy, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	51	8.05	4.89	12.32	2.14
BOD_5 (mg/L)	55	0.78	0.19	2.71	0.54
pH (standard units)	46	6.83	5.53	8.12	0.50
Total Organic Carbon (mg/L)	53	2.91	1.72	6.15	0.93
Ammonia as N (mg/L)	57	0.05	<0.005	0.32	0.07
NO_2+NO_3 as N (mg/L)	58	0.28	0.027	1.60	0.28
Orthophosphate as P (mg/L)	57	0.03	<0.005	0.21	0.04
Total phosphorus as P (mg/L)	53	0.07	0.01	0.26	0.06
Total hardness (mg/L)	30	22.07	13	158.00	25.78
Chloride (mg/L)	58	2.86	1.8	5.95	0.97
Sulfate (mg/L)	57	4.73	3.48	7.31	0.80
Total dissolved solids (mg/L)	47	40.06	29	61.50	7.23
Total suspended solids (mg/L)	46	11.37	<1.0	128.50	22.01
Turbidity (NTU)	57	10.67	<1.0	81.00	13.31

SEGMENT 4F WHITE RIVER FROM MOUTH OF BLACK RIVER TO MOUTH OF BUFFALO RIVER

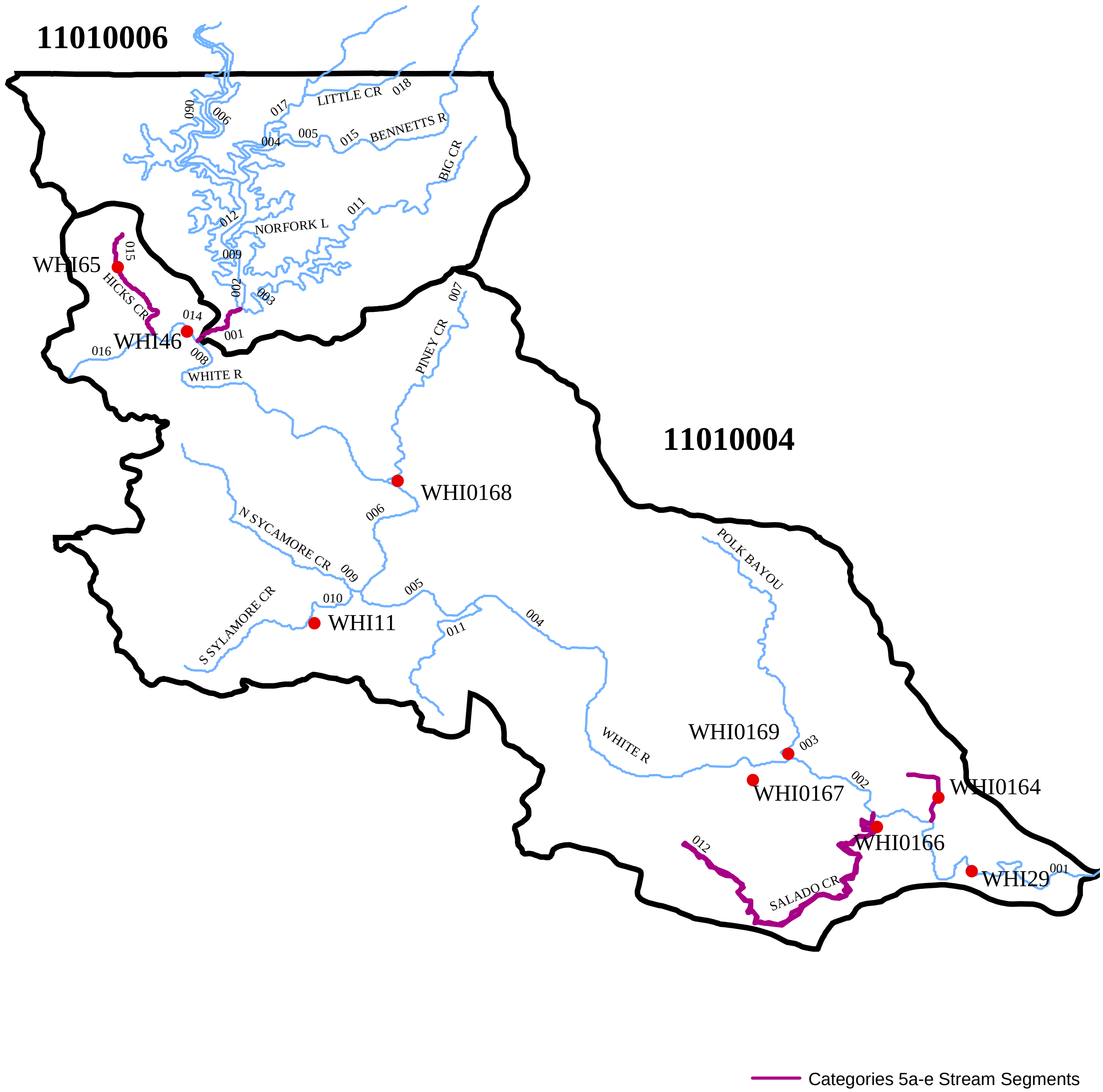
Segment 4F includes Baxter, Fulton, Izard, Stone, Independence and Sharp counties. The segment encompasses a 125-mile reach of the White River and its major tributaries - Polk Bayou, Sylamore Creek, Salado Creek, Hicks Creek, North Fork River, and Bennett's River.

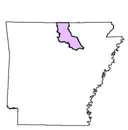
Summary of Water Quality Conditions

Waters within this segment have been designated for fish and wildlife propagation, primary and secondary contact recreation, domestic, agricultural, and industrial water supply uses. Outstanding state or national resource waters make up 19.1 miles within the segment. Use support assessments were made on 220.5 miles of streams. The 9.1 miles of Hicks Creek did not meet the drinking water use due to high nitrates. The source of the contaminant is a municipal point source discharge. A TMDL has been completed for Hicks Creek. All other waters assessed in this segment were found to be supporting all designated uses.

Several waterbody segments are currently assessed as exceeding the in-stream bacteria standard. The upcoming revision of Regulation No. 2, the "Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas" in 2004, will establish the use of *E. coli* bacteria for the assessment of primary contact recreation. It is anticipated that this will change the assessment of these waterbodies to fully supporting. All other waters in this segment were meeting designated uses.

Figure A-58: Planning Segment 4F – Monitoring Stations



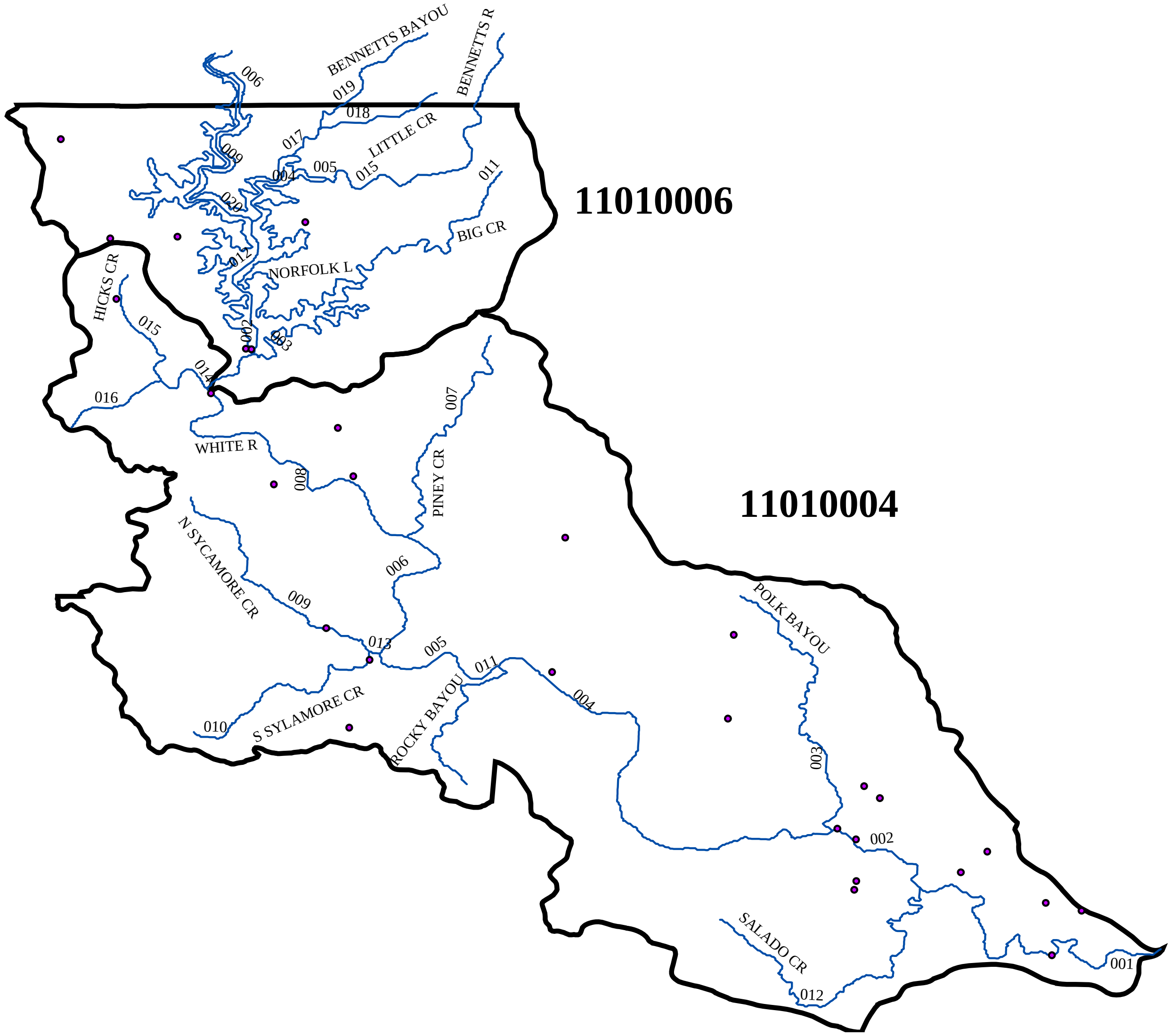


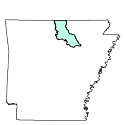
(Segment 4F)

Table A-161: Planning Segment 4F—Designated Use Attainment Status

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	WHI29	M	S	S	S	S	S	S									1				FISH CONSUMPTION	220.5	0
White River	11010004	-002	8.2		E	S	S	S	S	S	S									1				AQUATIC LIFE	207.2	13.3
Polk Bayou	11010004	-003	23.4		U															3				PRIMARY CONTACT	164	56.5
White River	11010004	-004	32.6		E	S	S	S	S	S	S									1				SECONDARY CONTACT	220.5	0
White River	11010004	-005	9.6		E	S	S	S	S	S	S									1				DRINKING SUPPLY	211.4	9.1
White River	11010004	-006	12.5		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	220.5	0
White River	11010004	-008	23.6		E	S	S	S	S	S	S									1						
Piney Creek	11010004	-007	19.7		U															3						
North Sylamore	11010004	-009	18.4		E	S	S	S	S	S	S									1						
South Sylamore	11010004	-010	16	WHI11	M	S	S	S	S	S	S									1						
Rocky Bayou	11010004	-011	13.5		U															3						
Salado Creek	11010004	-012	27.4	WHI166	M	S	S	N	S	S	S	AG				PA				5b						
North Sylamore	11010004	-013	0.7		E	S	S	S	S	S	S									1						
White River	11010004	-014	4.7	WHI46	M	S	S	S	S	S	S									1						
Hicks Creek	11010004	-015	9.1	WHI65	M	S	N	N	S	N	S	MP	MP	MP	MP	NO3	Cu	PA	TP	4a	5a	5d	5d			
White River	11010004	-016	6.8		E	S	S	S	S	S	S									1						
Greenbrier Creek	11010004	-017	10.6	WHI167	M	S	S	N	S	S	S	AG				PA				5b						
Big Creek	11010004	-018	9.4	WHI164	M	S	S	N	S	S	S	AG				PA				5b						
Norfork 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		U															3						
Bennetts River	11010006	-019	12.7		U															3						
Little Creek	11010006	-018	7.8		U															3						
TOTAL MILES	334.3																									
MILES UNASSESSED	113.8																									
MILES EVALUATED	112.4																									
MILES MONITORED	108.1																									

Figure A-59: Planning Segment 4F – NPDES Permitted Facilities





(Segment 4F)

Table A-162: Segment 4F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0001589	GALLOWAY SAND & GRAVEL	WHITE R	11010004	4F
AR0001783	BAXTER HEALTHCARE CORP-WALKER	WALKER CR TRIB,PIGEON CR,NORFORK LAKE	11010006	4F
AR0001899	UNIMIN CORP-GUION PLANT	ROCKY BAYOU (1) & BACKWATER SLOUGH (2)	11010004	4F
AR0002437	USDIBSFW-NORFORK NATL FISH HAT	DRY RUN CR,N FORK ,WHITE R	11010006	4F
AR0020036	MELBOURNE, CITY OF	MILL CR,PINEY CR,WHITE R	11010004	4F
AR0020117	MOUNTAIN VIEW, CITY OF	HUGHES CR/SYLAMORE CR	11010004	4F
AR0020664	USDAFS-BLANCHARD SPRINGS	NORTH SYLAMORE CR,SOUTH SYLAMORE CR,WHITE R	11010004	4F
AR0020702	BATESVILLE, CITY OF	WHITE R	11010004	4F
AR0021211	MOUNTAIN HOME, CITY OF	HICKS CR,BIG CR,WHITE R,	11010004	4F
AR0021229	NEWARK, CITY OF	WHITE RIVER	11010004	4F
AR0034517	USDIBSFW-NORFORK NATL FISH HAT	DRY CR/NORTH FORK R	11010006	4F
AR0034606	CALICO ROCK, CITY OF	WHITE R	11010004	4F
AR0035386	EASTMAN CHEMICAL CO	DITCH,WHITE R	11010004	4F
AR0036081	HOLIDAY MOUNTAIN RESORT	SYLAMORE CR	11010004	4F
AR0037451	ENTERGY AR, INC-INDEPENDENCE	WHITE R	11010004	4F
AR0042226	ROLLING MEADOWS MOBILE HOME ES	PANTHER CR TRIB	11010004	4F
AR0043036	NORFORK, CITY OF	TOWN CR/WHITE R	11010004	4F
AR0044016	AR DEPT OF CORRECTION-IZARD CO	TRIB-MOCCASIN CR	11010004	4F
AR0044113	CALVARY BIBLE SCHOOL	MILL CR/WHITE R	11010004	4F
AR0045357	MOUNT PLEASANT HOUSING AUTH	BARREN FORK CR,POLK BAYOU,WHITE R	11010004	4F
AR0046680	SULPHUR ROCK, CITY OF	BIG CR	11010004	4F
AR0046779	SOUTHSIDE SCHOOL DIST #3	EAST BRANCH/DOUBLE CR,CANEY CR	11010004	4F
AR0047031	CUSHMAN HOUSING AUTH	TRIB/SPRING CR	11010004	4F
AR0047406	MIDWEST LIME CO	DITCH/MILLER CR/POKE BAYOU/WHITE R/AR	11010004	4F
AR0047597	OIL TROUGH, CITY OF	WHITE R	11010004	4F
AR0048631	RLH LANDFILL #3	HUTCH CR TRIB,PIGEON CR,LAKE NORFORK	11010006	4F

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0048798	OZARK CAR WASH	LAKE NORFORK TRIB	11010006	4F
AR0048992	AR HWY DEPT-DISTRICT 5 HQ	DOUBLE BRANCH, CANEY CR, SALADO CR	11010006	4F
AR0049069	CUSHMAN SAW MILL INC	CR DITCH,HWY 25 DITCH,PFEIFER CR	11010004	4F

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	8.11	4.39	13.50	2.18
BOD_5 (mg/L)	55	0.39	-0.05	3.15	0.47
pH (standard units)	52	7.7	6.36	8.55	0.39
Total Organic Carbon (mg/L)	52	1.87	<1.0	5.20	1.04
Ammonia as N (mg/L)	57	0.01	<0.005	0.05	0.01
NO_2+NO_3 as N (mg/L)	58	0.6	0.036	1.55	0.38
Orthophosphate as P (mg/L)	57	0.04	0.015	0.10	0.02
Total phosphorus as P (mg/L)	52	0.07	0.01	0.49	0.09
Total hardness (mg/L)	29	135.66	74	226.00	23.45
Chloride (mg/L)	58	5.29	2.03	8.34	1.39
Sulfate (mg/L)	57	9.92	3.92	18.30	2.65
Total dissolved solids (mg/L)	46	165.22	117.5	204.50	13.38
Total suspended solids (mg/L)	45	7.01	<1.0	225.00	33.28
Turbidity (NTU)	57	10.68	<1.0	354.00	48.47

Table A-164: WHI0029 White River at Oil Trough, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	52	8.6	5.56	12.60	1.77
BOD_5 (mg/L)	54	0.6	0.00	1.20	0.28
pH (standard units)	51	7.86	7.05	8.43	0.31
Total Organic Carbon (mg/L)	51	2.49	<1.0	4.30	0.65
Ammonia as N (mg/L)	56	0.03	<0.005	0.69	0.09
NO_2+NO_3 as N (mg/L)	57	0.25	<0.01	0.63	0.13
Orthophosphate as P (mg/L)	56	0.02	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	52	0.05	0.01	0.36	0.06
Total hardness (mg/L)	28	141.61	121	174.00	11.71
Chloride (mg/L)	57	5.4	3.16	7.11	1.09
Sulfate (mg/L)	56	7.57	4.87	10.12	1.12
Total dissolved solids (mg/L)	46	163.9	138	219.50	12.97
Total suspended solids (mg/L)	45	9.7	1.5	66.00	10.96
Turbidity (NTU)	56	6.74	1.5	31.00	6.30

Table A-165: WHI0046 White River Near Norfork, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	10.45	7.75	13.00	1.41
BOD_5 (mg/L)	56	0.7	0.00	3.30	0.53
pH (standard units)	59	7.96	7.23	8.49	0.29
Total Organic Carbon (mg/L)	53	2.58	<1.0	4.94	0.80
Ammonia as N (mg/L)	58	0.01	<0.005	0.07	0.01
NO_2+NO_3 as N (mg/L)	58	0.25	<0.01	0.50	0.13
Orthophosphate as P (mg/L)	59	0.01	<0.005	0.10	0.02
Total phosphorus as P (mg/L)	55	0.04	0.01	0.45	0.06
Total hardness (mg/L)	29	126.83	99	143.00	10.61
Chloride (mg/L)	59	5.29	1.65	9.03	1.42
Sulfate (mg/L)	59	6.74	3.89	7.82	0.74
Total dissolved solids (mg/L)	44	147.05	107	164.00	12.04
Total suspended solids (mg/L)	46	2.18	<1.0	11.50	2.37
Turbidity (NTU)	59	3.14	<1.0	26.70	5.21

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	10.87	6.70	13.70	1.91
BOD_5 (mg/L)	54	1.24	0.00	6.51	1.06
pH (standard units)	57	8.15	7.15	8.69	0.27
Total Organic Carbon (mg/L)	51	4.56	2.295	10.00	1.55
Ammonia as N (mg/L)	56	0.06	<0.005	1.36	0.22
NO_2+NO_3 as N (mg/L)	56	2.79	1.11	4.68	0.91
Orthophosphate as P (mg/L)	57	1.59	0.39	5.68	0.95
Total phosphorus as P (mg/L)	54	1.52	0.396	3.34	0.79
Total hardness (mg/L)	28	203.19	109	261.00	34.90
Chloride (mg/L)	57	59.47	18	147.00	26.96
Sulfate (mg/L)	57	22.17	10.7	29.40	3.68
Total dissolved solids (mg/L)	44	346.76	216.5	470.00	55.70
Total suspended solids (mg/L)	46	3.17	<1.0	17.80	3.00
Turbidity (NTU)	57	5.27	<1.0	60.40	11.19

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.

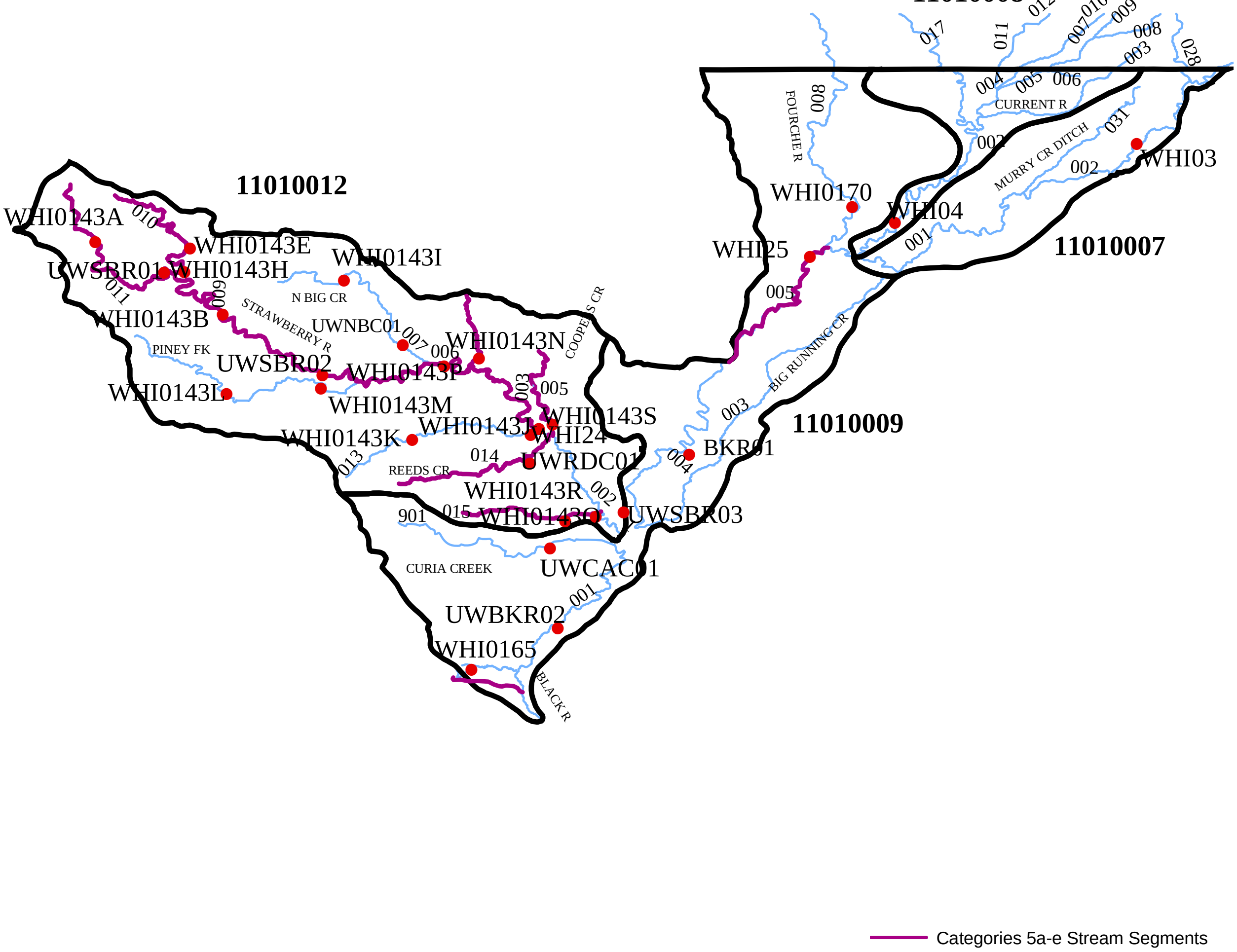
Summary of Water Quality Conditions

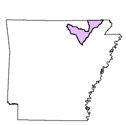
Fish and wildlife propagation, primary and secondary contact recreation, domestic, agricultural, and industrial water supplies are the designated uses for all waters within this segment. Also, 112.2 miles of these streams are designated as outstanding state or national resource waters. The water quality 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.

An intensive study of the Strawberry River in this segment allowed for the evaluation of almost the entire watershed. The study concluded that seven stream segments totaling 93.2 stream miles were not supporting the aquatic life use because of excessive in-stream turbidity, and that eight stream segments totaling 121.5 stream miles were not supporting the primary contact recreation use because of excessive bacteria concentrations. The source of the turbidity is from agriculture land use practices, unpaved county roads, eroding stream banks. The source of the bacteria is primarily from agriculture practices. A TMDL should be completed by early 2006. The final report can be downloaded from the Department's web site at:

www.adeq.state.ar.us/water/reports_data.htm

Figure A-60: Planning Segment 4G – Monitoring Stations



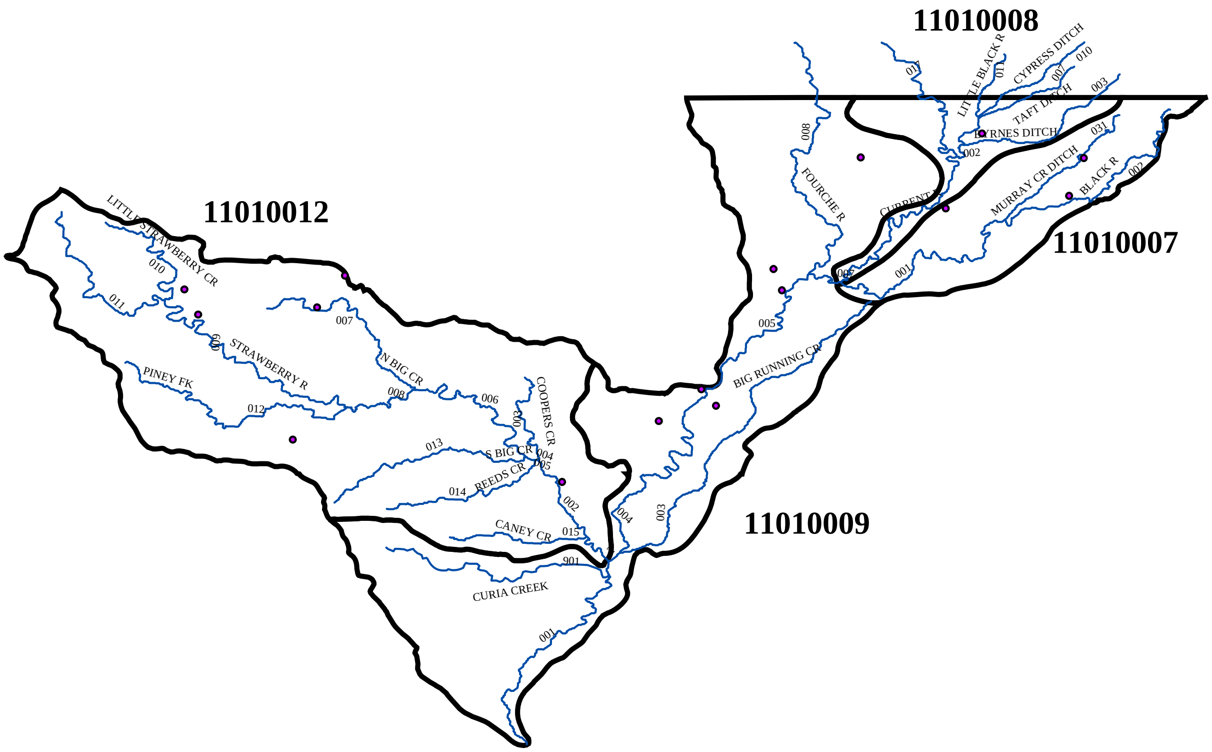


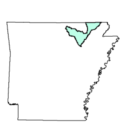
(Segment 4G)

Table A-167: Planning Segment 4G—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-4G																										
Black River	11010007	-001	24.2		E	S	S	S	S	S	S									1				FISH CONSUMPTION	440.7	0
Black River	11010007	-002	22.7	WHI03	M	S	S	S	S	S	S									1				AQUATIC LIFE	330	110.7
Murray Creek	11010007	-031	15.2		U															3				PRIMARY CONTACT	297.4	143.3
Current River	11010008	-001	23.6	WHI04	M	S	S	S	S	S	S									1				SECONDARY CONTACT	440.7	0
Current River	11010008	-017	12		E	S	S	S	S	S	S									1				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	BKR02	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	BKR01	M	S	S	S	S	S	S									1						
Black River	11010009	-005	17.5	WHI25	M	S	N	S	S	S	S	AG				DO				5d						
Black River	11010009	-007	3.8		U															3						
Big Running C.	11010009	-003	36		U															3						
Fourche River	11010009	-008	25	WHI170	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	SBR03	M	S	S	S	S	S	S									1						
Coopers Creek	11010012	-003	11.8	WHI143S	M	S	S	N	S	S	S	AG				PA				5a						
Strawberry R.	11010012	-004	0.3		E	S	N	S	S	S	S	SE				SI				5a						
Strawberry R.	11010012	-005	0.7		E	S	N	S	S	S	S	SE				SI				5a						
Strawberry R.	11010012	-006	19	WHI24	M	S	N	S	S	S	S	SE	AG			SI	DO			5a	5d					
N. Big Creek	11010012	-007	20.8	NBC01	M	S	S	S	S	S	S									1						
Strawberry R.	11010012	-008	8.4		E	S	N	N	S	S	S	SE	AG			SI	PA			5a	5a					
Strawberry R.	11010012	-009	28.4	SBR02	M	S	N	N	S	S	S	SE	AG			SI	PA			5a	5a					
L.Strawberry	11010012	-010	16	WHI143H+	M	S	N	N	S	S	S	SE	AG			SI	PA			5a	5a					
Strawberry R.	11010012	-011	20.4	SBR01	M	S	N	N	S	S	S	SE	AG			SI	PA			5a	5a					
Piney Fork	11010012	-012	26.1	WHI143L+	M	S	S	S	S	S	S									1						
S. Big Creek	11010012	-013	19.3	WHI143K+	M	S	S	S	S	S	S									1						
Reeds Creek	11010012	-014	15	RDC01	M	S	S	N	S	S	S	AG				PA				5a						
Mill Creek	11010012	-016	9.9	WHI143N	M	S	S	N	S	S	S	AG				PA				5a						
Caney Creek	11010012	-015	11.6	WHI143Q&R	M	S	S	N	S	S	S	AG				PA				5a						
Curia Creek	11010009	-901	18	CAC01	M	S	S	S	S	S	S									1						
Data Creek	11010009	-902	21.8	WHI165	M	S	S	N	S	S	S	AG				PA				5b						
TOTAL MILES	522.2																									
MILES UNASSESSED	81.5																									
MILES EVALUATED	51.2																									
MILES MONITORED	389.5																									

Figure A-61: Planning Segment 4G – NPDES Permitted Facilities





(Segment 4G)

Table A-168: Segment 4G Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0022110	CAVE CITY, CITY OF	CURIA CR/BLACK R	11010009	4G
AR0022209	REYNO, CITY OF	MURRAY CR DITCH/BLACK R/WHITE R	11010007	4G
AR0033979	CORNING, CITY OF	BLACK R	11010007	4G
AR0034835	POCAHONTAS, CITY OF	BLACK R	11010009	4G
AR0035254	HORSESHOE BEND, CITY OF-WHITE OAK	LITTLE STRAWBERRY R TRIB,STRAWBERRY R	11010012	4G
AR0036820	MACLEAN-ESNA	MANSKER CR TRIB,BLACK R	11010009	4G
AR0037508	BLACK ROCK, CITY WATER & SEWER	TRIB/BLACK R/WHITE R	11010009	4G
AR0038199	AR PARKS & TOURISM-LAKE CHARLES	LAKE CHARLES	11010009	4G
AR0038326	ALLEGHENY WASTEWATER ASSN	TRIB,WORTHINGTON CR,HACKNEY CR	11010012	4G
AR0039608	HORSESHOE BEND, CITY OF-PARADISE ACRES	HUBBLE BRANCH,LITTLE STRAWBERRY R	11010012	4G
AR0040355	PORTIA, CITY OF	BLACK R	11010009	4G
AR0040533	DEER RUN PARK RESORT	DEER RUN LAKE, MILL CR, PINEY FORK	11010012	4G
AR0041742	ASH FLAT, CITY OF	TRIB,N BIG CR,STRAWBERRY R,BLACK R	11010012	4G
AR0043834	MAYNARD, CITY OF	LEMMONS-BIG CRS/FOURCHE-BLACK/WHITE	11010009	4G
AR0047911	J.W. BLACK LUMBER CO	TRIB,CORNING LAKE	11010007	4G
AR0048071	SUCCESS, TOWN OF	TRIB,L.BLACK R,CURRENT R,BLACK R	11010008	4G
AR0048488	WESTERN LAWRENCE CO WWT DIST	STRAWBERRY R TRIB	11010012	4G

Table A-169: WHI0003 Black River Near Corning, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	61	7.14	3.64	11.50	2.03
BOD_5 (mg/L)	55	1.2	0.20	4.27	0.68
pH (standard units)	60	7.53	5.36	8.68	0.63
Total Organic Carbon (mg/L)	54	3.04	1.18	11.87	2.12
Ammonia as N (mg/L)	59	0.03	<0.005	0.16	0.04
NO_2+NO_3 as N (mg/L)	58	0.22	<0.01	3.48	0.45
Orthophosphate as P (mg/L)	59	0.04	0.006	0.33	0.05
Total phosphorus as P (mg/L)	53	0.1	0.01	0.59	0.10
Total hardness (mg/L)	29	116.14	34	154.00	32.44
Chloride (mg/L)	59	4.21	1.95	16.70	2.13
Sulfate (mg/L)	59	8.6	4.93	14.05	1.88
Total dissolved solids (mg/L)	45	144.83	86.5	191.00	26.21
Total suspended solids (mg/L)	42	32.58	4	372.00	59.20
Turbidity (NTU)	59	33.31	1.2	260.00	50.85

Table A-170: WHI0004 Current River Near Pocahontas, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	60	7.62	4.57	16.40	2.12
BOD_5 (mg/L)	54	0.76	0.00	2.59	0.52
pH (standard units)	59	7.65	5.29	8.92	0.63
Total Organic Carbon (mg/L)	53	1.99	<1.0	7.40	1.37
Ammonia as N (mg/L)	58	0.02	<0.005	0.08	0.02
NO_2+NO_3 as N (mg/L)	57	0.24	0.03	0.52	0.11
Orthophosphate as P (mg/L)	58	0.02	<0.005	0.12	0.02
Total phosphorus as P (mg/L)	52	0.05	0.01	0.33	0.05
Total hardness (mg/L)	28	152.14	58	184.00	28.74
Chloride (mg/L)	57	2.99	1.84	5.79	0.65
Sulfate (mg/L)	57	4.32	3	9.07	1.04
Total dissolved solids (mg/L)	45	165.37	115	215.00	23.64
Total suspended solids (mg/L)	42	13.47	1	149.00	23.28
Turbidity (NTU)	58	12.9	1.2	150.00	23.35

Table A-171: WHI0024 Strawberry River S. of Smithville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	68	8.26	4.51	12.55	2.09
BOD_5 (mg/L)	72	0.77	0.00	4.08	0.59
pH (standard units)	69	7.9	7.11	8.60	0.29
Total Organic Carbon (mg/L)	68	2.98	<1.0	19.50	2.74
Ammonia as N (mg/L)	73	0.02	<0.005	0.40	0.05
NO_2+NO_3 as N (mg/L)	74	0.18	<0.01	0.81	0.16
Orthophosphate as P (mg/L)	74	0.02	<0.005	0.27	0.04
Total phosphorus as P (mg/L)	69	0.06	0.01	0.52	0.09
Total hardness (mg/L)	45	192.88	101	234.00	35.20
Chloride (mg/L)	75	3.07	2.02	5.78	0.76
Sulfate (mg/L)	74	5.07	3.3	7.88	1.13
Total dissolved solids (mg/L)	60	203.96	143	235.00	23.28
Total suspended solids (mg/L)	59	33.17	1.8	610.00	86.52
Turbidity (NTU)	74	12.53	1.4	78.00	17.24

Table A-172: WHI0025 Black River at Pocahontas, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.16	4.05	11.90	1.88
BOD_5 (mg/L)	54	0.84	0.00	2.58	0.54
pH (standard units)	58	7.63	6.12	8.30	0.44
Total Organic Carbon (mg/L)	53	2.65	<1.0	8.30	1.56
Ammonia as N (mg/L)	58	0.02	<0.005	0.08	0.02
NO_2+NO_3 as N (mg/L)	57	0.19	<0.01	0.39	0.09
Orthophosphate as P (mg/L)	58	0.03	<0.005	0.08	0.02
Total phosphorus as P (mg/L)	52	0.07	0.01	0.40	0.06
Total hardness (mg/L)	27	140.77	77	179.00	30.36
Chloride (mg/L)	58	3.71	1.86	25.06	2.98
Sulfate (mg/L)	58	5.86	2.97	27.58	3.11
Total dissolved solids (mg/L)	45	157.21	98	212.50	26.14
Total suspended solids (mg/L)	42	21.43	2	171.00	26.52
Turbidity (NTU)	58	20.24	1.1	170.00	25.95

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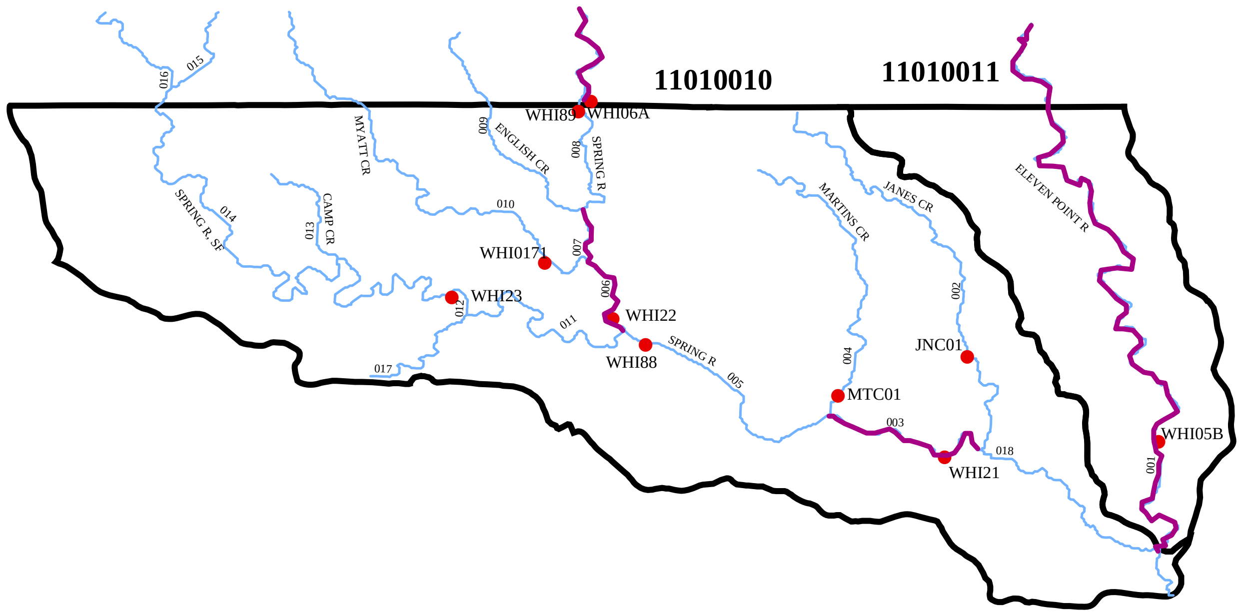
SEGMENT 4H SPRING RIVER, SOUTH FORK SPRING RIVER, AND ELEVEN POINT RIVER

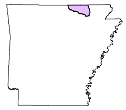
Segment 4H, in north central Arkansas, includes portions of Fulton, Sharp and Randolph counties. The segment encompasses the entire 46-mile length of the Spring River and its major tributaries, the South Fork Spring River, the Eleven Point River, Myatt Creek and Martin's Creek.

Summary of Water Quality Conditions

Designated uses for all waters within this segment include propagation of fish and wildlife, primary and secondary contact recreation, domestic, agriculture, and industrial water supplies. Additionally, about 74 percent of these waters are designated as outstanding state or national resource waters. Approximately 216.0 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. All waters in this segment were meeting designated uses. The lower reaches of the Spring River occasionally had high turbidity levels. These levels seem to be associated with major storm events and are likely caused by land clearing to the edge of the stream. However, the long-term trend data for the lower Spring River station do not show significant upward trends in turbidity or TSS. The South Fork of the Spring River, which in the past has contributed high bacteria and excessive turbidity to the Spring River, has not demonstrated these excessive values over the past several years. Janes Creek water quality appears to be near pristine levels.

Figure A-62: Planning Segment 4H – Monitoring Stations



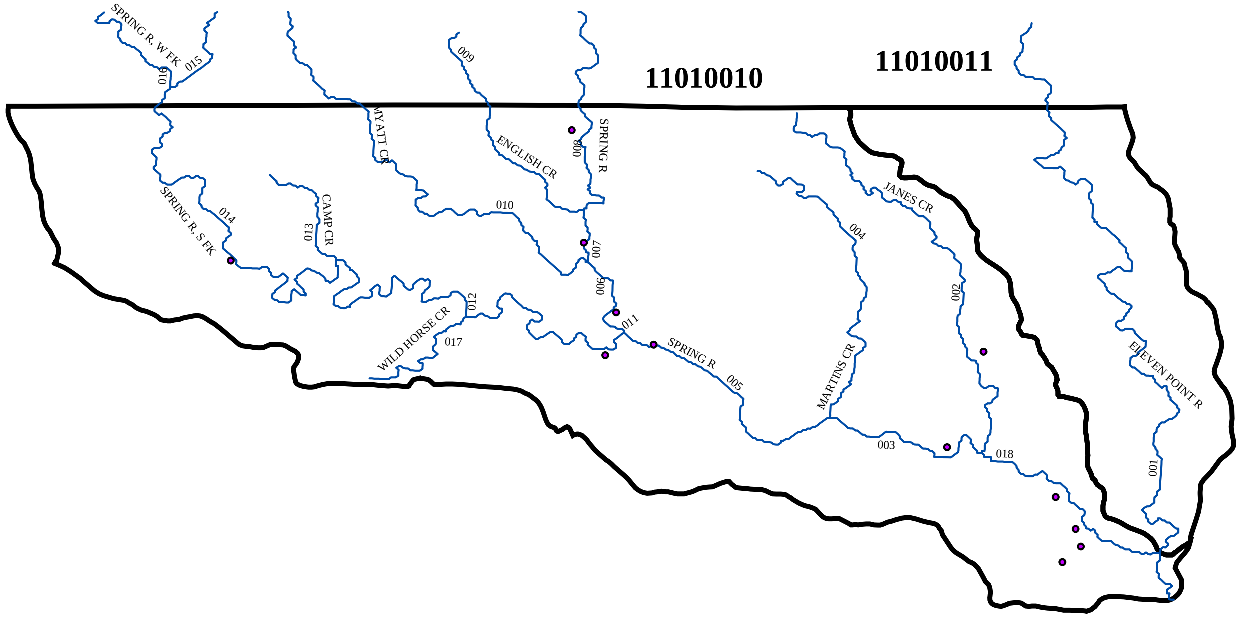


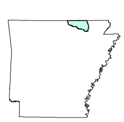
(Segment 4H)

Table A-173: Planning Segment 4H—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-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	JNC01	M	S	S	S	S	S	S									1				AQUATIC LIFE	171.3	45.6
Spring River	11010010	-003	9.4	WHI21	M	S	N	S	S	S	S	UN				DO				5d				PRIMARY CONTACT	216.9	0
Martins Creek	11010010	-004	19	MTC01	M	S	S	S	S	S	S									1				SECONDARY CONTACT	216.9	0
Spring River	11010010	-005	13.2	WHI88	M	S	S	S	S	S	S									1				DRINKING SUPPLY	216.9	0
Spring River	11010010	-006	5.3	WHI22	M	S	S	S	S	S	S	UN				Temp				5d				AGRI & INDUSTRY	209.8	7.1
Spring River	11010010	-007	4		E	S	S	S	S	S	N	UN				Temp				5d						
Warm Fork Spring R.	11010010	-008t	3.1	WHI06A	M	S	N	S	S	S	N	UN	UN			DO	TDS			5d	5e					
Spring River	11010010	-008	8.8	WHI89	M	S	S	S	S	S	S									1						
English Creek	11010010	-009	6.5		U															3						
Myatt Creek	11010010	-010	26	WHI171	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	WHI23	M	S	S	S	S	S	S									1						
S. Fork Spring	11010010	-014	24		E	S	S	S	S	S	S									1						
Camp Creek	11010010	-013	7		U															3						
Wild Horse C.	11010010	-017	7.7		U															3						
Spring River	11010010	-018	12		E	S	S	S	S	S	S									1						
Eleven Point	11010011	-001	33.1	WHI05B	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																									

Figure A-63: Planning Segment 4H – NPDES Permitted Facilities





(Segment 4H)

Table A-174: Segment 4H Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0002879	AR GAME & FISH COMM-SPRING R	SPRING R	11010010	4H
AR0021628	IMBODEN, TOWN OF	WAYLAND CR/SPRING R/BLACK R	11010010	4H
AR0023850	MAMMOTH SPRING, CITY OF	SPRING R TRIB,SPRING R	11010010	4H
AR0034282	CHEROKEE VILLAGE SEWER INC	SOUTH FORK SPRING R	11010010	4H
AR0034789	SALEM, CITY OF	SOUTH FORK/SPRING R	11010010	4H
AR0037991	HARDY, CITY OF	SPRING R,BLACK R	11010010	4H
AR0040312	HIGHLAND SQUARE COIN OPERATED	TRIB/LAKE MIRANDY	11010010	4H
AR0041254	RAVENDEN, CITY OF	TRIB/SPRING R/BLACK R/WHITE RB	11010010	4H
AR0046922	VULCAN CONSTR MATERIALS-BLACK	HWY 63 DITCH, BRUSHY CR,. . . , BLACK R	11010010	4H
AR0047198	MARTIN MARIETTA MATERIALS-BLAC	STENNITT CREEK	11010010	4H
AR0048712	RAVENDEN SPRINGS, TOWN OF	JOHNS CR TRIB, JANES CR, SPRING R	11010010	4H
AR0049107	MARTIN MARIETTA MATERIALS-CAVE	SPRING R	11010010	4H

Table A-175: WHI0005B Eleven Point River Near Pocahontas, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.5	3.91	11.90	1.79
BOD_5 (mg/L)	54	0.72	0.00	2.12	0.53
pH (standard units)	58	7.8	6.69	8.83	0.41
Total Organic Carbon (mg/L)	53	1.56	<1.0	4.60	0.88
Ammonia as N (mg/L)	58	0.02	<0.005	0.15	0.03
NO_2+NO_3 as N (mg/L)	57	0.42	0.096	0.83	0.16
Orthophosphate as P (mg/L)	58	0.01	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	52	0.03	0.01	0.10	0.02
Total hardness (mg/L)	27	196.89	139	224.00	19.96
Chloride (mg/L)	59	2.65	1.53	3.92	0.47
Sulfate (mg/L)	59	3.45	2.33	5.05	0.56
Total dissolved solids (mg/L)	45	203.29	132.5	251.00	21.91
Total suspended solids (mg/L)	42	9.08	<1.0	43.50	9.86
Turbidity (NTU)	58	6.9	<1.0	56.00	8.83

Table A-176: WHI0006A Spring River Near Thayer, MO

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	8.2	3.00	13.40	2.51
BOD_5 (mg/L)	55	0.68	0.00	2.68	0.42
pH (standard units)	58	7.81	6.88	8.62	0.43
Total Organic Carbon (mg/L)	51	2.05	<1.0	5.75	0.92
Ammonia as N (mg/L)	58	0.03	<0.005	0.13	0.03
NO_2+NO_3 as N (mg/L)	57	0.59	0.139	1.23	0.26
Orthophosphate as P (mg/L)	58	0.07	<0.005	0.86	0.12
Total phosphorus as P (mg/L)	54	0.11	0.01	1.05	0.18
Total hardness (mg/L)	30	261.39	209	345.00	26.92
Chloride (mg/L)	58	7.59	2	27.10	4.96
Sulfate (mg/L)	58	5.37	2.67	53.45	6.53
Total dissolved solids (mg/L)	44	274.27	194	344.50	40.82
Total suspended solids (mg/L)	45	4.72	<1.0	32.00	5.48
Turbidity (NTU)	58	6.19	1	44.00	8.56

Table A-177: WHI0021 Spring River S. of Ravenden, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	7.63	3.95	12.30	1.79
BOD_5 (mg/L)	54	0.73	0.00	5.07	0.71
pH (standard units)	58	7.89	6.03	8.83	0.52
Total Organic Carbon (mg/L)	52	2.11	<1.0	8.72	1.53
Ammonia as N (mg/L)	58	0.01	<0.005	0.06	0.02
NO_2+NO_3 as N (mg/L)	57	0.47	0.067	3.94	0.56
Orthophosphate as P (mg/L)	58	0.12	<0.005	4.00	0.61
Total phosphorus as P (mg/L)	52	0.16	0.01	4.24	0.67
Total hardness (mg/L)	28	219.49	79	254.00	34.04
Chloride (mg/L)	59	4.68	1.37	54.08	7.56
Sulfate (mg/L)	59	4.45	2.82	20.70	2.92
Total dissolved solids (mg/L)	45	233.32	174.5	288.00	20.15
Total suspended solids (mg/L)	42	8.47	1.5	46.00	8.63
Turbidity (NTU)	58	6.29	1.6	34.00	6.86

Table A-178: WHI0022 Spring River NW of Hardy, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	60	9.58	7.34	12.90	1.38
BOD_5 (mg/L)	56	0.43	0.00	1.00	0.20
pH (standard units)	60	8.14	7.37	8.74	0.24
Total Organic Carbon (mg/L)	54	1.42	<1.0	4.80	0.74
Ammonia as N (mg/L)	60	0.01	<0.005	0.06	0.01
NO_2+NO_3 as N (mg/L)	59	0.6	0.307	1.18	0.20
Orthophosphate as P (mg/L)	60	0.02	<0.005	0.05	0.01
Total phosphorus as P (mg/L)	56	0.04	0.01	0.08	0.02
Total hardness (mg/L)	30	231.44	198	263.00	14.21
Chloride (mg/L)	60	3.62	1.65	8.11	1.05
Sulfate (mg/L)	60	3.81	2.63	7.14	0.77
Total dissolved solids (mg/L)	45	238.62	205	260.00	13.06
Total suspended solids (mg/L)	47	4.92	<1.0	29.50	4.46
Turbidity (NTU)	60	4.4	1.2	33.80	5.21

Table A-179: WHI0023 South Fork Spring River Near Saddle, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	59	9.37	5.18	13.20	2.15
BOD_5 (mg/L)	56	0.73	0.00	2.12	0.39
pH (standard units)	59	7.96	7.39	8.58	0.23
Total Organic Carbon (mg/L)	53	2.37	<1.0	8.71	1.29
Ammonia as N (mg/L)	58	0.01	<0.005	0.05	0.01
NO_2+NO_3 as N (mg/L)	58	0.18	<0.01	1.00	0.22
Orthophosphate as P (mg/L)	59	0.01	<0.005	0.12	0.02
Total phosphorus as P (mg/L)	55	0.03	0.01	0.17	0.03
Total hardness (mg/L)	30	205.12	123	255.00	26.71
Chloride (mg/L)	59	3.74	1.93	5.01	0.74
Sulfate (mg/L)	59	3.56	2.19	6.61	0.90
Total dissolved solids (mg/L)	44	217.97	144	279.00	29.44
Total suspended solids (mg/L)	46	3.59	<1.0	38.00	5.45
Turbidity (NTU)	59	4.29	1.1	31.00	6.33

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	9.65	7.34	12.60	1.63
BOD_5 (mg/L)	56	0.67	0.00	2.68	0.40
pH (standard units)	59	8.13	7.51	8.64	0.22
Total Organic Carbon (mg/L)	53	1.78	<1.0	5.30	0.97
Ammonia as N (mg/L)	58	0.01	<0.005	0.06	0.01
NO_2+NO_3 as N (mg/L)	58	0.46	0.219	0.94	0.17
Orthophosphate as P (mg/L)	59	0.02	<0.005	0.09	0.02
Total phosphorus as P (mg/L)	55	0.04	0.01	0.14	0.03
Total hardness (mg/L)	30	229.61	196	270.00	15.76
Chloride (mg/L)	59	3.49	1.64	5.55	0.72
Sulfate (mg/L)	59	3.71	2.62	4.99	0.57
Total dissolved solids (mg/L)	44	238.26	187	258.00	15.58
Total suspended solids (mg/L)	46	5.48	1	31.00	5.23
Turbidity (NTU)	59	5	1.4	40.30	6.24

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)	60	7.28	5.95	11.20	0.96
BOD_5 (mg/L)	57	0.32	-0.05	1.33	0.33
pH (standard units)	60	7.37	6.26	8.10	0.32
Total Organic Carbon (mg/L)	54	0.97	<1.0	2.90	0.61
Ammonia as N (mg/L)	59	0	<0.005	0.02	0.00
NO_2+NO_3 as N (mg/L)	59	0.99	0.575	1.88	0.28
Orthophosphate as P (mg/L)	60	0.04	0.013	0.10	0.01
Total phosphorus as P (mg/L)	56	0.04	0.01	0.11	0.02
Total hardness (mg/L)	30	222.07	174	253.00	17.52
Chloride (mg/L)	60	3.8	1.73	7.46	1.01
Sulfate (mg/L)	60	3.62	2.48	4.90	0.51
Total dissolved solids (mg/L)	45	233.07	180	249.50	15.45
Total suspended solids (mg/L)	47	1.68	<1.0	6.50	1.58
Turbidity (NTU)	60	4.11	<1.0	37.10	5.46

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SEGMENT 4I WHITE RIVER FROM CROOKED CREEK TO LONG CREEK

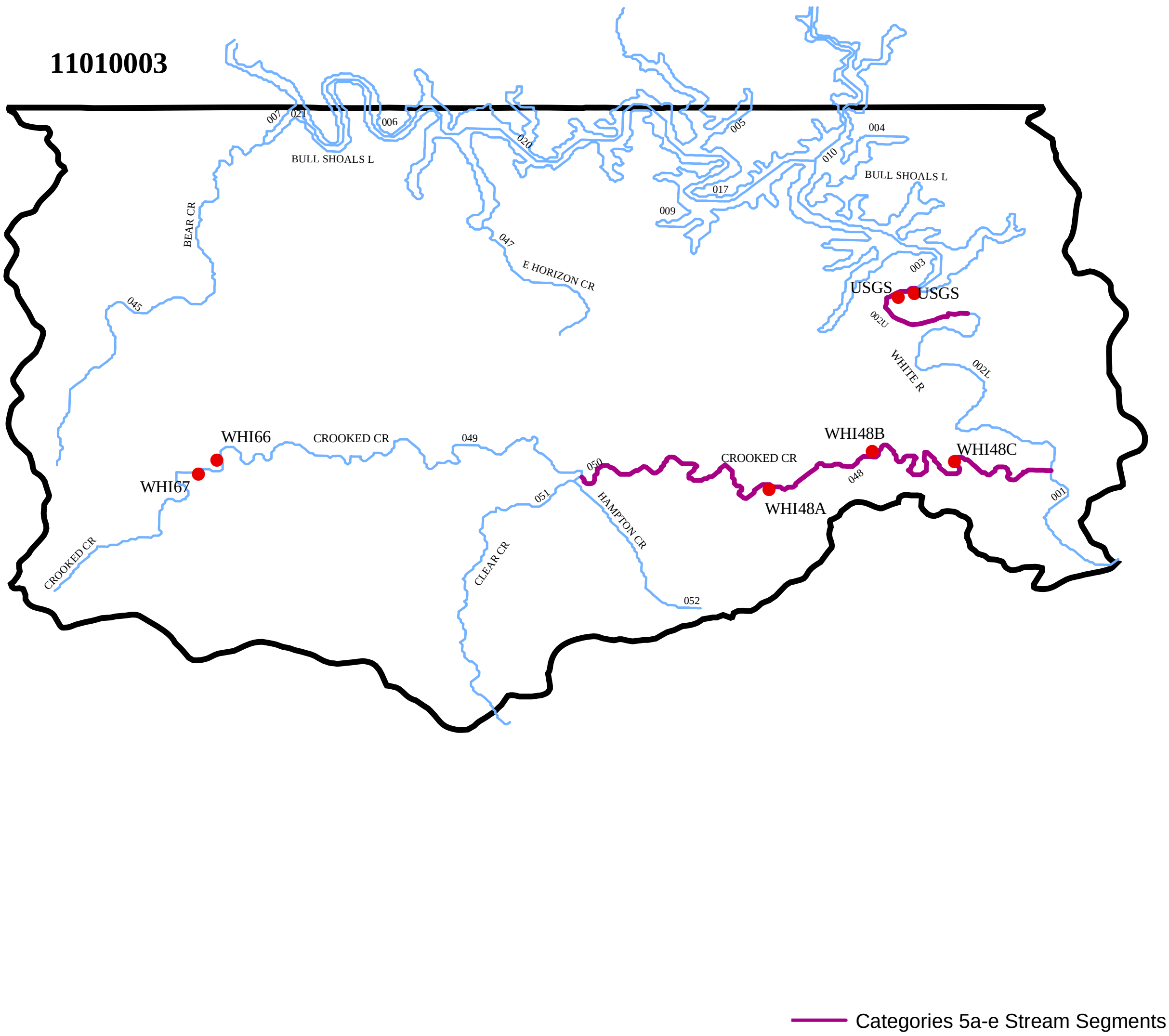
Segment 4I, located in north central Arkansas, includes portions of Boone, and Marion counties. This segment encompasses a 31-mile reach of the White River and Crooked Creek and its tributaries.

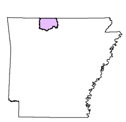
Summary of Water Quality Conditions

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 91.3 miles of stream uses, and 7.6 stream miles were evaluated. All waters assessed in this segment were supporting all designated uses.

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-64: Planning Segment 4I – Monitoring Stations



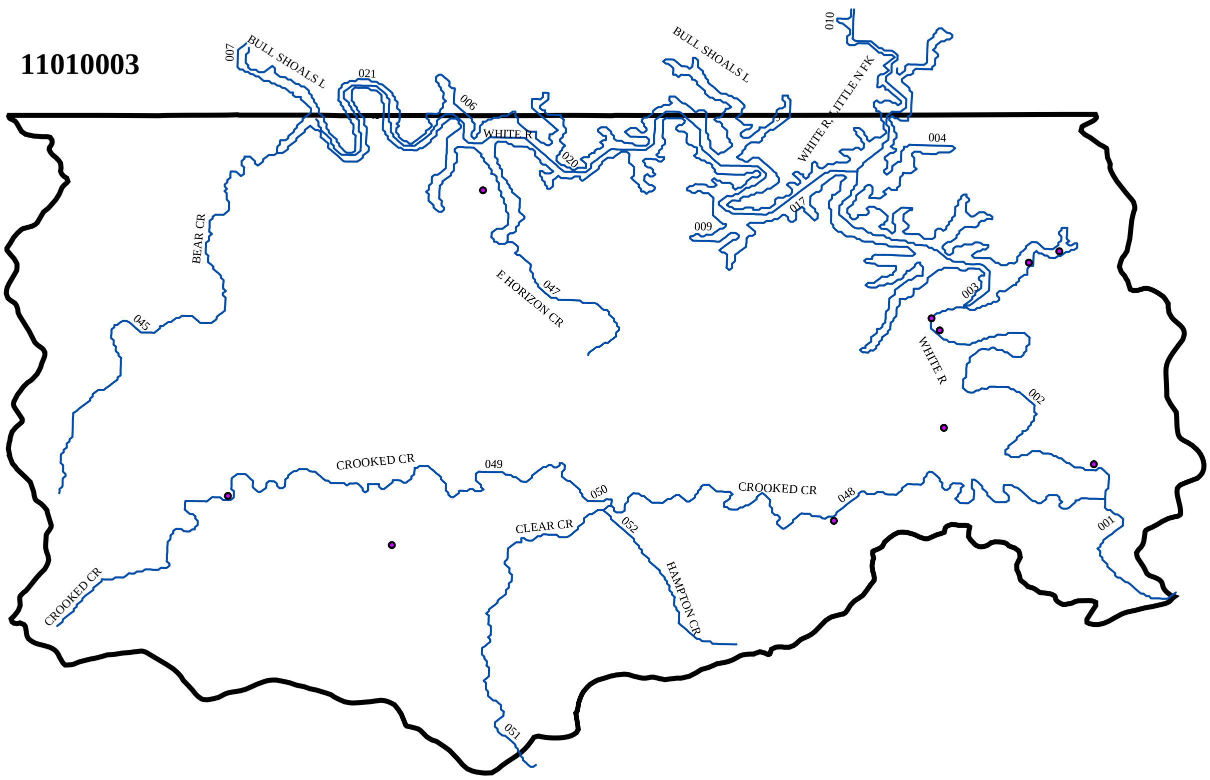


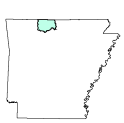
(Segment 4I)

Table A-182: Planning Segment 4I—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 4I																										
White River	11010003	-001	7.6		E	S	S	S	S	S	S									1				FISH CONSUMPTION	98.9	0
White River	11010003	002U	3	USGS	M	S	N	S	S	S	S	HP				DO				5a				AQUATIC LIFE	64.2	34.7
White River	11010003	002L	20.4	USGS	M	S	S	S	S	S	S									1						
Bear Creek	11010003	-045	25.9		U															3				PRIMARY CONTACT	98.9	0
E. Horizon C.	11010003	-047	8.9		U															3				SECONDARY CONTACT	98.9	0
Crooked Creek	11010003	-048	31.7	WHI48A,B,C	M	S	N	S	S	N	N	RE	UN			Temp	TDS			5a	5e			DRINKING SUPPLY	67.2	31.7
Crooked Creek	11010003	-049	36.2	WHI66&67	M	S	S	S	S	S	N	UN				TDS				5e				AGRI & INDUSTRY	31	67.9
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	61.9																									
MILES EVALUATED	7.6																									
MILES MONITORED	91.3																									

Figure A-65: Planning Segment 4I – NPDES Permitted Facilities





(Segment 4I)

Table A-183: Segment 4I Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0021717	FLIPPIN, CITY OF	FALLEN ASH CR,WHITE R	11010003	4I
AR0033545	COTTER-GASSVILLE, TOWNS OF	WHITE R	11010003	4I
AR0034037	YELLVILLE, CITY OF	CROOKED CREEK, WHITE R	11010003	4I
AR0034321	HARRISON, CITY OF	CROOKED CR,WHITE R	11010003	4I
AR0037028	BULL SHOALS, CITY OF	WHITE R	11010003	4I
AR0037052	AR PARKS & TOURISM-BULL SHOALS	WHITE R	11010003	4I
AR0037435	HOLIDAY SHORES RESORT	BULL SHOALS LAKE TRIB	11010003	4I
AR0043753	SUGARLOAF WASTEWATER DIST	EAST SUGARLOAF CR,BULL SHOALS LAKE	11010003	4I
AR0045390	HOLTBY’S INC	TRIB/MEEK CR	11010003	4I
AR0048518	LAURENCE’S CEDAR OAKS RESORT	BULL SHOALS LAKE	11010003	4I

Table A-184: WHI0048A Crooked Creek at Yellville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	54	10.14	4.57	13.30	1.97
BOD_5 (mg/L)	54	0.66	0.00	1.49	0.30
pH (standard units)	56	8.07	7.49	8.75	0.22
Total Organic Carbon (mg/L)	50	5.96	<1.0	204.00	28.59
Ammonia as N (mg/L)	55	0.01	<0.005	0.08	0.02
NO_2+NO_3 as N (mg/L)	55	0.78	<0.01	2.70	0.69
Orthophosphate as P (mg/L)	56	0.01	<0.005	0.13	0.02
Total phosphorus as P (mg/L)	53	0.03	0.01	0.12	0.02
Total hardness (mg/L)	28	160.24	119	204.00	19.69
Chloride (mg/L)	56	8.24	4.05	12.73	2.10
Sulfate (mg/L)	56	6.7	4.36	8.74	1.23
Total dissolved solids (mg/L)	41	189.4	156	231.00	15.11
Total suspended solids (mg/L)	43	3.96	<1.0	26.00	4.42
Turbidity (NTU)	56	4.15	<1.0	42.20	7.06

Table A-185: WHI0048B Crooked Creek 2 Miles South of Flippin

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	23	10.61	6.51	13.70	2.09
BOD_5 (mg/L)	24	0.82	0.28	2.00	0.46
pH (standard units)	25	8.12	7.37	8.36	0.22
Total Organic Carbon (mg/L)	22	1.99	<1.0	3.60	0.81
Ammonia as N (mg/L)	25	0.01	<0.005	0.05	0.01
NO_2+NO_3 as N (mg/L)	24	1.28	0.119	2.70	0.63
Orthophosphate as P (mg/L)	25	0.01	<0.005	0.03	0.01
Total phosphorus as P (mg/L)	24	0.03	0.01	0.06	0.02
Total hardness (mg/L)	12	168.08	109	196.00	23.75
Chloride (mg/L)	25	6.62	2.61	10.06	1.87
Sulfate (mg/L)	25	6.29	4.77	8.58	1.04
Total dissolved solids (mg/L)	18	611.5	162.5	7701.50	1769.51
Total suspended solids (mg/L)	19	4.56	<1.0	26.50	6.98
Turbidity (NTU)	25	3.83	1	19.00	3.91

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)	23	10.16	5.99	13.10	2.17
BOD_5 (mg/L)	24	1.48	0.27	3.26	0.87
pH (standard units)	25	8.16	7.65	8.55	0.23
Total Organic Carbon (mg/L)	22	3.25	1.238	8.22	1.77
Ammonia as N (mg/L)	25	0.01	<0.005	0.04	0.01
NO_2+NO_3 as N (mg/L)	24	1.06	0.02	2.61	0.76
Orthophosphate as P (mg/L)	25	0.01	<0.005	0.03	0.01
Total phosphorus as P (mg/L)	24	0.04	0.01	0.08	0.02
Total hardness (mg/L)	13	169.15	138	193.00	18.02
Chloride (mg/L)	25	6.47	3.89	11.80	2.02
Sulfate (mg/L)	25	6.88	4.03	14.17	2.22
Total dissolved solids (mg/L)	18	192.06	164	214.00	17.56
Total suspended solids (mg/L)	19	5.59	<1.0	19.00	5.41
Turbidity (NTU)	25	5.3	<1.0	31.50	6.31

Table A-187: WHI0066 Crooked Cr. Downstream of Harrison, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	10.59	6.37	15.20	2.26
BOD_5 (mg/L)	58	0.83	0.00	3.46	0.67
pH (standard units)	57	7.51	6.20	8.14	0.40
Total Organic Carbon (mg/L)	51	2.25	1.027	5.30	0.72
Ammonia as N (mg/L)	59	0.04	<0.005	0.46	0.07
NO_2+NO_3 as N (mg/L)	59	2.74	1.21	5.08	0.85
Orthophosphate as P (mg/L)	59	0.2	0.027	0.54	0.14
Total phosphorus as P (mg/L)	55	0.22	0.045	0.56	0.13
Total hardness (mg/L)	28	156.66	<1.0	196.00	38.44
Chloride (mg/L)	60	15.59	5	36.20	6.64
Sulfate (mg/L)	60	11.73	4.9	21.70	4.53
Total dissolved solids (mg/L)	47	220.5	148.5	269.00	32.27
Total suspended solids (mg/L)	47	5.22	<1.0	25.50	5.32
Turbidity (NTU)	57	8.39	<1.0	67.00	12.44

Table A-188: WHI0067 Crooked Cr. Upstream of Harrison, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	9.92	6.38	14.00	1.83
BOD_5 (mg/L)	58	0.69	0.00	2.76	0.58
pH (standard units)	57	7.22	5.65	8.14	0.46
Total Organic Carbon (mg/L)	51	1.83	<1.0	4.90	0.84
Ammonia as N (mg/L)	59	0.02	<0.005	0.12	0.03
NO_2+NO_3 as N (mg/L)	59	1.63	0.947	2.33	0.30
Orthophosphate as P (mg/L)	59	0.02	<0.005	0.10	0.02
Total phosphorus as P (mg/L)	55	0.04	0.01	0.17	0.04
Total hardness (mg/L)	28	163.14	108	207.00	24.92
Chloride (mg/L)	60	7.48	4.33	19.40	2.24
Sulfate (mg/L)	60	6.04	4.06	16.60	1.66
Total dissolved solids (mg/L)	47	197.83	144	231.00	23.20
Total suspended solids (mg/L)	47	5.79	<1.0	23.50	5.58
Turbidity (NTU)	57	7.83	1	51.00	10.46

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

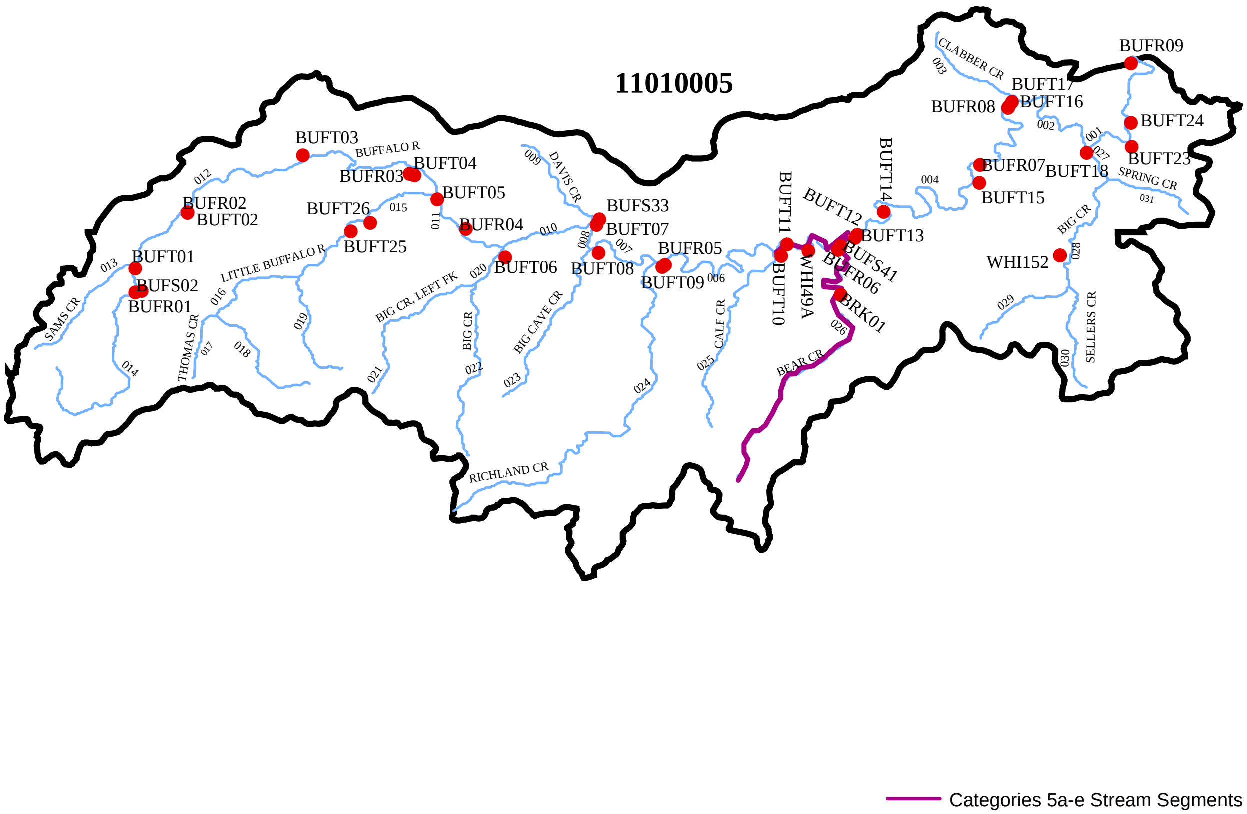
Designated uses of waters in this segment include propagation of fish and wildlife, primary and secondary contact recreation, domestic, agricultural, and industrial water supplies. Almost 48 percent are also designated as outstanding state or national resource waters. Only one routine monitoring station is located in this segment; however, over the past several years, a cooperative project with the Buffalo National River has added nine sites on the Buffalo River, 20 tributary sites and three spring sites. This has allowed the assessment of 264.1 stream miles and the evaluation of another 53 stream miles. All waters assessed in this segment met all designated uses. Although nutrient values are low in the Buffalo River, nitrite/nitrate-nitrogen values show an increase in a downstream direction. The most significant increases were noted below Boxley Valley and below Mill Creek (between Pruitt and Hasty). Of the 20 tributary sites, highest nitrite/nitrate-nitrogen concentrations were found in Mill Creek, Calf Creek, Brush Creek and Tomahawk Creek.

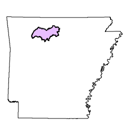
The mean nitrate values on the main stem of the Buffalo River during 1995-1998 are compared to the mean nitrate values for 1999-2001 in the figure on page A-264. An increase in the mean nitrate concentration is indicated at all stations except the uppermost station and two of the lower stations. The stations near Ponca and Gilbert showed the greatest increase. Nitrate concentrations in the main channel of the Buffalo National River are, on average, two thirds lower than those seen in the tributaries.

A similar comparison was made among the tributary streams and is shown in the figure on page A-264. Mill (Pruitt), Brush and Tomahawk Creeks show highest mean nitrate values. Mill Creek, Davis Creek, Clabber Creek, and Big Creek (lower) showed the greatest increase in nitrates since the 1995-1998 dataset.

Nitrate values in the springs sampled were about three times higher than in the main channel of the Buffalo River.

Figure A-66: Planning Segment 4J – Monitoring Stations



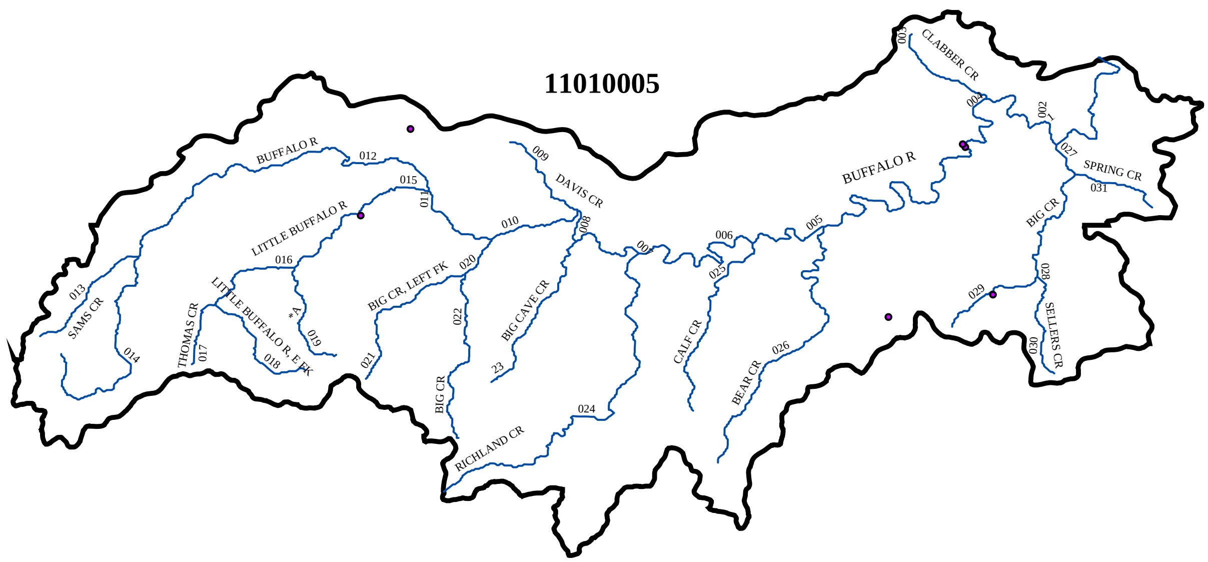


(Segment 4J)

Table A-189: Planning Segment 4J—Designated Use Attainment Status

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 4J																										
Buffalo River	11010005	-001	11.3	BUFR09	M	S	S	S	S	S	S									1				FISH CONSUMPTION	317.1	0
Buffalo River	11010005	-002	8.7		M	S	S	S	S	S	S									1				AQUATIC LIFE	310.2	6.9
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	WHI49A	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	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		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	BUFT08	M	S	S	S	S	S	S									1						
Richland Creek	11010005	-024	28.7	BUFT09	M	S	S	S	S	S	S									1						
Calf Creek	11010005	-025	15	BUFT10	M	S	S	S	S	S	S									1						
Bear Creek	11010005	-026	23.9	BRK01,+	M	S	S	S	S	S	N	MP				TDS				5b						
Big Creek	11010005	-027	2.6	BUFT18	M	S	S	S	S	S	S									1						
Big Creek	11010005	-028	9.4	WHI152	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																									
MILES MONITORED	264.1																									

Figure A-67: Planning Segment 4J – NPDES Permitted Facilities



(Segment 4J)

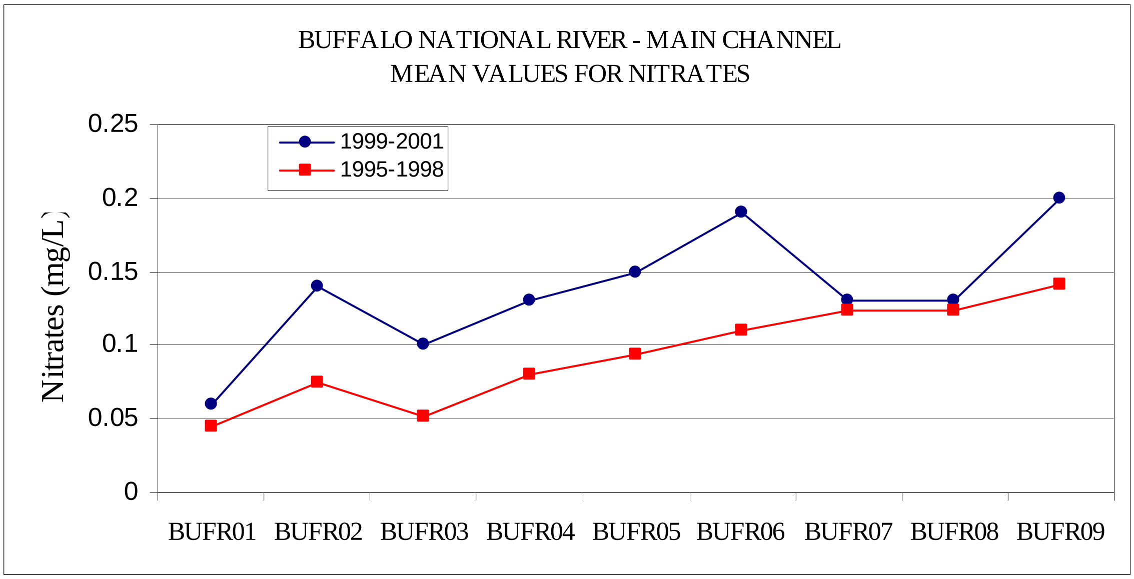
Table A-190: Segment 4J Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0034011	MARSHALL, CITY OF	FOREST CR,BEAR CR,BUFFALO R	11010005	4J
AR0034088	MARBLE FALLS SID #1-DOGPATCH	TRIB, MILL CR	11010005	4J
AR0034584	JASPER, CITY OF	L’ BUFFALO R/BUFFALO R/WHITE R	11010005	4J
AR0034941	USDINPS-BUFFALO NATL RIVER-BUF	BUFFALO R	11010005	4J
AR0034959	USDINPS-BUFFALO NATL RIVER-BUF	PANTHER CR,BUFFALO R	11010005	4J

Table A-191: WHI0049A Buffalo River near St. Joe, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	49	8.05	4.81	12.60	2.17
BOD_5 (mg/L)	55	0.47	-0.14	2.12	0.42
pH (standard units)	52	7.65	6.87	8.46	0.38
Total Organic Carbon (mg/L)	52	1.69	<1.0	4.76	0.87
Ammonia as N (mg/L)	56	0.01	<0.005	0.05	0.01
NO_2+NO_3 as N (mg/L)	57	0.18	<0.01	1.10	0.23
Orthophosphate as P (mg/L)	56	0.01	<0.005	0.06	0.01
Total phosphorus as P (mg/L)	50	0.03	0.01	0.34	0.05
Total hardness (mg/L)	28	98.21	54	134.00	21.79
Chloride (mg/L)	57	2.59	1.28	6.82	0.81
Sulfate (mg/L)	56	5.3	3.82	12.60	1.20
Total dissolved solids (mg/L)	46	118.71	86.5	151.00	20.16
Total suspended solids (mg/L)	45	4.73	<1.0	90.80	13.82
Turbidity (NTU)	56	5.47	<1.0	110.00	15.09

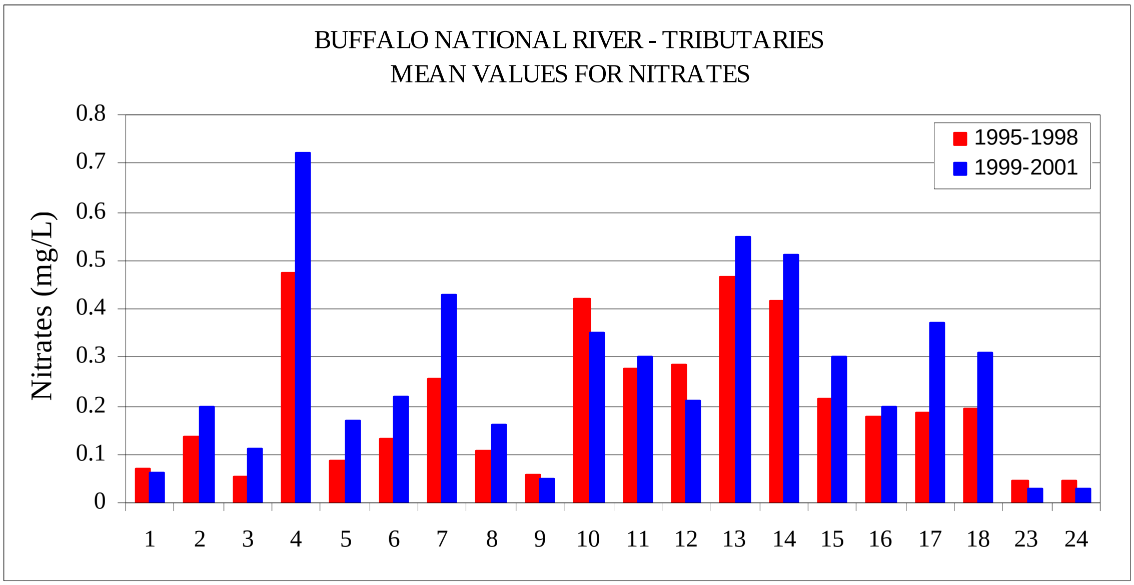
Figure A-68: Buffalo National River Main Channel Mean Values for Nitrates



Legend

BUFR01 – Above Ponca	BUFR04 – Hasty	BUFR07 – Ark. Hwy. 14
BUFR02 – Ponca	BUFR05 – Woolum	BUFR08 – Rush
BUFR03 – Pruitt	BUFR06 – Cilbert	BUFR09 – Mouth of River

Figure A-69: Buffalo National River Tributaries Mean Values for Nitrates



Legend

1 – Beech Creek

2 – Ponca Creek

3 – Cecil Creek

4 – Mill Creek (Pruitt)

5 – Little Buffalo

6 – Big Creek (S. Hasty)

7 – Davis Creek

8 – Cave Creek

9 – Richland Creek

10 – Calf Creek

11 – Mill Creek (St. Joe)

12 – Bear Creek

13 – Brush Creek

14 – Tomahawk Creek

15 – Water Creek

16 – Rush Creek

17 – Clabber Creek

18 – Big Creek (lower)

23 – Middle Creek

24 – Leatherwood Creek

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.

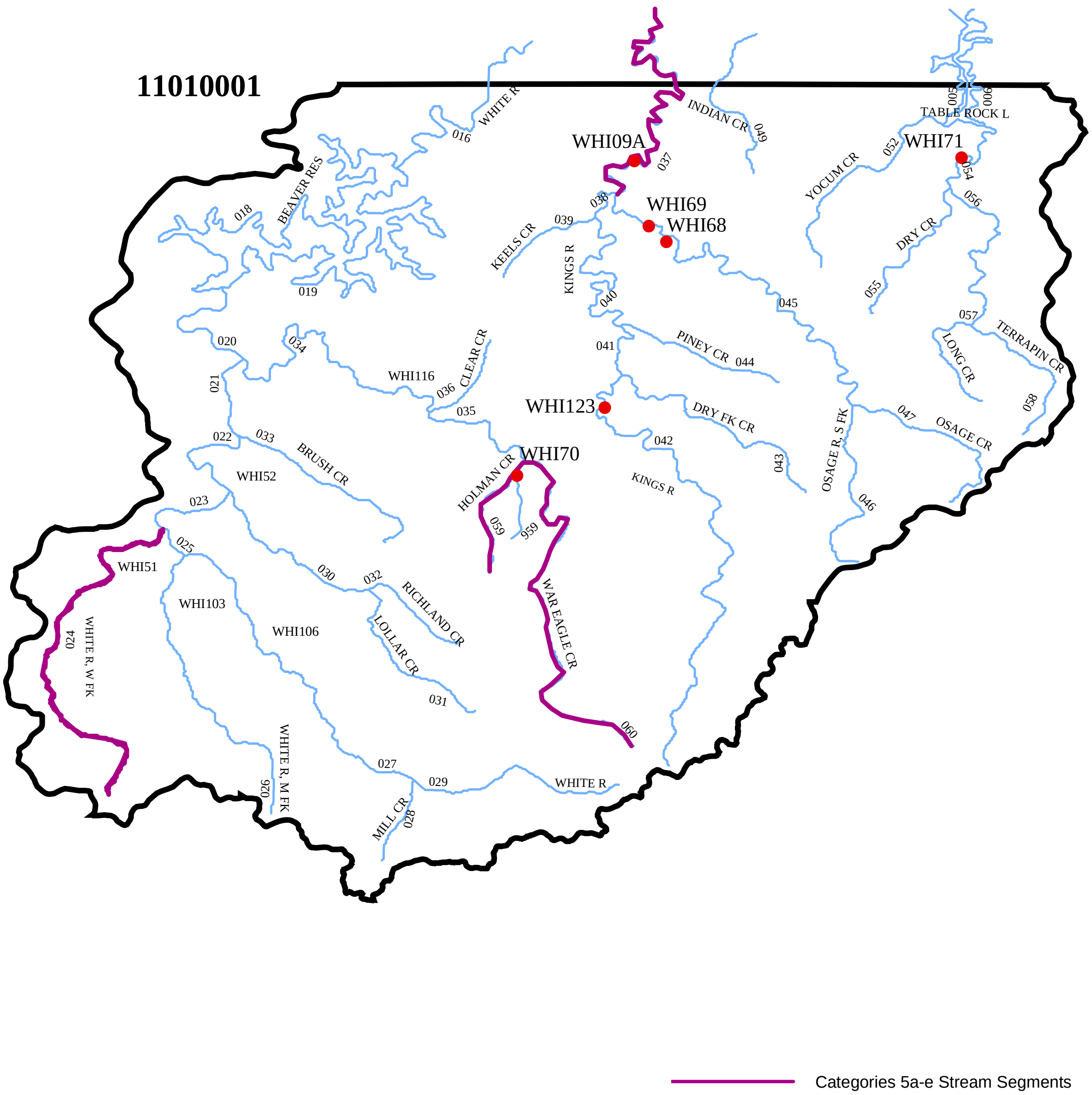
Summary of Water Quality Conditions

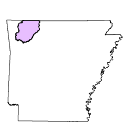
All waters within this segment are designated for propagation of fish and wildlife, primary and secondary contact recreation, domestic, agricultural, and industrial water supplies. Also, about 20 percent of these waters are designated as outstanding state or national resource waters. A total of 208 miles of streams were monitored for use support utilizing data from 11 routine monitoring stations. An additional 193.3 miles were evaluated. Aquatic life use was assessed as not supported in 33.4 miles of the West Fork of the White River. The major cause was high turbidity levels and excessive silt loads. A comparison of the monthly turbidity values in the West Fork over the past ten years indicates a decreasing trend in turbidity concentration (Figure A-72 on page A-276). The most probable sources are: (1) agriculture land clearing; (2) road construction and maintenance; and (3) gravel removal from stream beds.

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 nitrates. A TMDL has been completed for this stream segment for nitrates.

The charts on page A-277 plot total phosphorus in Osage Creek and in the Kings River below the confluence of Osage Creek. The plots demonstrate that the high phosphorus values in Osage Creek influences the phosphorus levels in Kings River, primarily during the low run-off periods. It is also apparent that from 1995 to 1998 there was a dramatic increasing trend in the amount of phosphorus released into Osage Creek. However, since 1998 there has been a dramatic decreasing trend in the amount of phosphorus in Osage Creek. Major upgrades to the Berryville Waste Water Treatment Facility occurred in the late 1990’s.

Figure A-70: Planning Segment 4K – Monitoring Stations



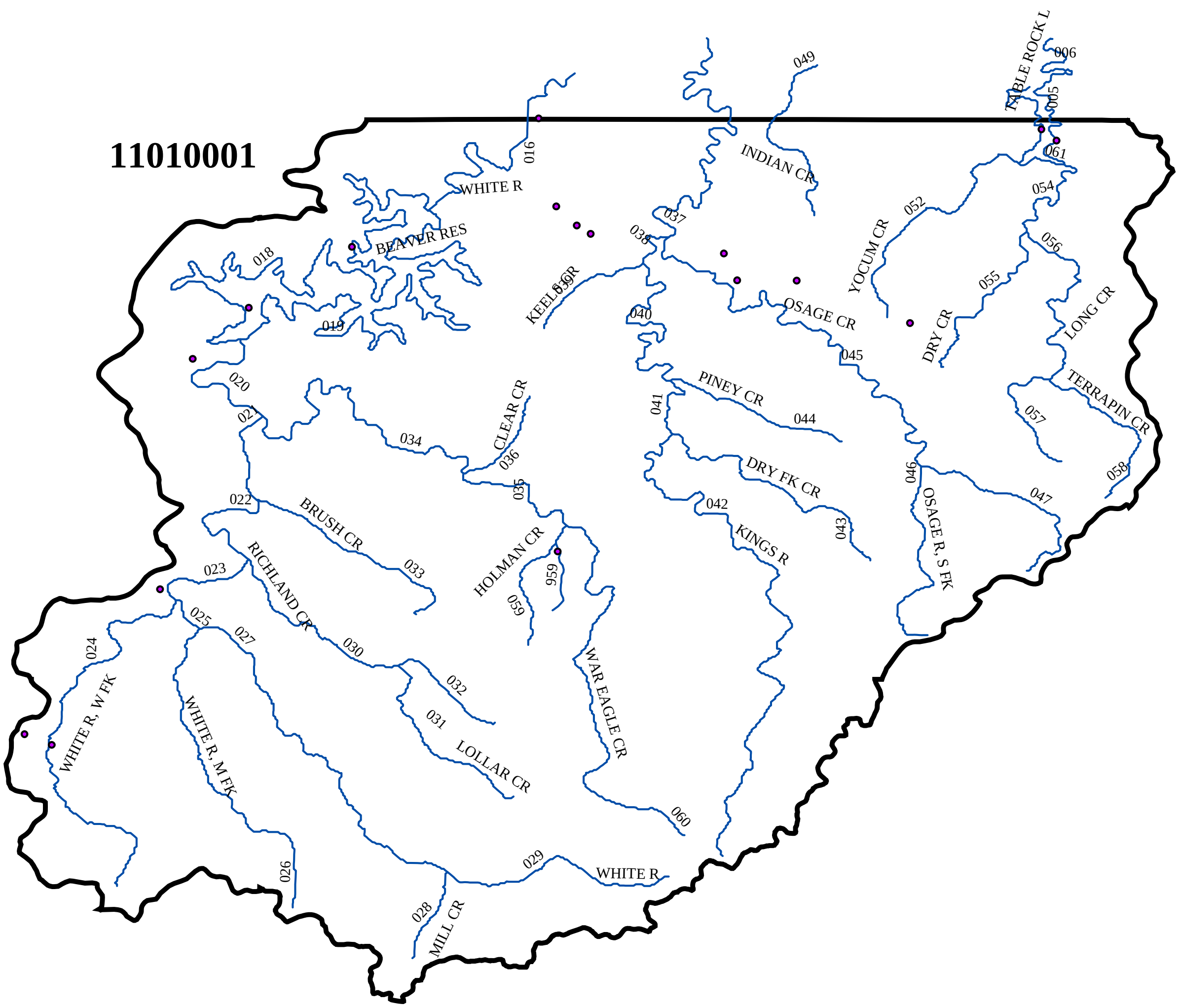


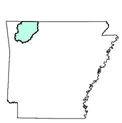
(Segment 4K)

Table A-193: Planning Segment 4K—Designated Use Attainment Status

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	-016	2.4		U															3				FISH CONSUMPTION	401.3	0
White River	11010001	-020	9.8		U															3				AQUATIC LIFE	344.1	57.2
White River	11010001	-021	6.1		U															3				PRIMARY CONTACT	296.6	0
White River	11010001	-022	8.3		U															3				SECONDARY CONTACT	401.3	0
White River	11010001	-023	6.2	WHI52	M	S	N	S	S	S	N	SE	AG	AG	AG	SI	Cl	SO4	TDS	5a	5e	5e	5e	DRINKING SUPPLY	363.9	37.4
West Fork	11010001	-024	27.2	WHI51	M	S	N	S	S	S	N	SE	UN	RC/AG		SI	SO4	TDS		5a	5b	5e		AGRI & INDUSTRY	311.4	89.9
White River	11010001	-025	2.4		U															3						
Middle Fork	11010001	-026	21.9	WHI103	M	S	S	S	S	S	S									1						
White River	11010001	-027	23.8	WHI106	M	S	N	S	S	S	S	UN				DO				5e						
Mill Creek	11010001	-028	6.1		U															3						
White River	11010001	-029	13.5		E	S	S	S	S	S	S									1						
Richland Cr.	11010001	-030	12.1		E	S	S	S	S	S	S									1						
Lollar Creek	11010001	-031	12.5		U															3						
Richland Cr.	11010001	-032	7.1		U															3						
Brush Creek	11010001	-033	13.5		E	S	S		S	S	S									2						
War Eagle Cr.	11010001	-034	22.2	WHI116	M	S	S	S	S	S	S									1						
War Eagle Cr.	11010001	-035	8.6		E	S	S	S	S	S	S									1						
Clear Creek	11010001	-036	6.7		U															3						
Kings River	11010001	-037	19.1	WHI09A	M	S	S	S	S	S	N	MP				TDS				5b						
Kings River	11010001	-038	3.4		E	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		E	S	S	S	S	S	S									1						
Kings River	11010001	-042	39.5	WHI123	M	S	S	S	S	S	S									1						
Keels Creek	11010001	-039	7.3		U															3						
Dry Fork	11010001	-043	16.5		E	S	S		S	S	S									2						
Piney Creek	11010001	-044	10.2		E	S	S		S	S	S									2						
Osage Creek	11010001	045U	25.6	WHI68	M	S	S	S	S	S	S									1						
Osage Creek	11010001	045L	5	WHI69	M	S	S	S	S	S	S									1						
South Fork	11010001	-046	13.8		U															3						
Osage Creek	11010001	-047	13.4		E	S	S		S	S	S									2						
Yocum Creek	11010001	-052	16.2		E	S	S		S	S	S									2						
Long Creek	11010001	-054	8.4	WHI71	M	S	S	S	S	S	S									1						
Dry Creek	11010001	-055	12		E	S	S		S	S	S									2						
Long Creek	11010001	-056	14.3		E	S	S		S	S	S									2						
Long Creek	11010001	-057	8.6		E	S	S		S	S	S									2						
Terrapin Cr.	11010001	-058	11.2		U															3						
Holman Creek	11010001	-059	9.1	WHI70	M	S	S	S	S	N	N	MP	MP	MP	MP	NU	CL	SO4	TDS	4a	5b	5b	5b			
War Eagle Cr.	11010001	-060	28.3		E	S	S	S	S	N	N	MP	MP	MP		CL	SO4	TDS		5b	5b	5b				
TOTAL MILES	495																									
MILES UNASSESSED	93.7																									
MILES EVALUATED	193.3																									
MILES MONITORED	208																									

Figure A-71: Planning Segment 4K – NPDES Permitted Facilities





(Segment 4K)

Table A-193: Segment 4K Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0020010	FAYETTEVILLE, CITY OF	WEST FORK WHITE R (1) & MUD CR-AR R(2)	11010001	4K
AR0021741	GREEN FOREST, CITY OF	TRIB,DRY CR,LONG CR	11010001	4K
AR0021792	BERRYVILLE, CITY OF	FREEMAN BRANCH,OSAGE CR,KINGS R	11010001	4K
AR0021865	EUREKA SPRINGS, CITY OF	LEATHERWOOD CR	11010001	4K
AR0022004	HUNTSVILLE, CITY OF	TOWN BRANCH/HOLMAN CR/WAR EAGLE CR	11010001	4K
AR0022373	WEST FORK, CITY OF	WEST FORK WHITE R	11010001	4K
AR0033197	HERITAGE BAY HOMEOWNERS ASSN	BEAVER LAKE	11010001	4K
AR0036676	LOST BRIDGE VILLAGE W&S DIST	BEAVER LAKE	11010001	4K
AR0037249	HOLIDAY ISLAND SID	TABLE ROCK LAKE	11010001	4K
AR0037320	BEAVER LODGE, INC	MONTE NE COVE-BEAVER LAKE	11010001	4K
AR0040118	COUNTRY MOUNTAIN INN	TRIB-KEELS CR/KINGS R	11010001	4K
AR0044059	CARROLL ELECTRIC COOP CORP	TRIB,CLABBER CR,KING R	11010001	4K
AR0044300	TEYAR LLC	LEATHERWOOD CR	11010001	4K
AR0045667	APAC-ARKANSAS, INC-WEST FORK	TRIB/W FK/WHITE R	11010001	4K
AR0047619	CARROLL COUNTY STONE, INC	TRIB, WARDEN BRANCH, OSAGE CR	11010001	4K
AR0048844	OUTDOOR RESORTS OF THE OZARKS	TABLE ROCK LAKE, IMPD, WHITE R	11010001	4K
AR0049191	CRICKETT CREEK R ESTATES	TABLE ROCK LAKE	11010001	4K

Table A-194: WHI0009A Kings River N. of Berryville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.8	6.40	15.40	2.21
BOD_5 (mg/L)	55	0.69	0.04	1.82	0.40
pH (standard units)	55	7.65	6.01	8.78	0.60
Total Organic Carbon (mg/L)	49	2.18	<1.0	5.45	0.80
Ammonia as N (mg/L)	56	0.02	<0.005	0.21	0.03
NO_2+NO_3 as N (mg/L)	56	0.56	0.026	1.92	0.50
Orthophosphate as P (mg/L)	56	0.34	0.009	2.33	0.42
Total phosphorus as P (mg/L)	53	0.31	0.034	2.35	0.39
Total hardness (mg/L)	25	120.44	77	151.00	16.61
Chloride (mg/L)	57	9.44	2.06	35.60	7.31
Sulfate (mg/L)	57	7.74	3.93	16.00	2.62
Total dissolved solids (mg/L)	48	157.1	84	297.00	41.22
Total suspended solids (mg/L)	48	7.75	<1.0	96.00	18.02
Turbidity (NTU)	54	7.5	<1.0	81.00	15.02

Table A-195: WHI0051 West Fork White River near Fayetteville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	9.04	5.49	14.00	2.48
BOD_5 (mg/L)	58	0.93	0.00	2.74	0.62
pH (standard units)	54	7.47	6.17	8.84	0.44
Total Organic Carbon (mg/L)	52	2.94	1.074	5.90	1.11
Ammonia as N (mg/L)	60	0.02	<0.005	0.06	0.02
NO_2+NO_3 as N (mg/L)	58	0.59	0.019	2.39	0.50
Orthophosphate as P (mg/L)	60	0.01	<0.005	0.08	0.01
Total phosphorus as P (mg/L)	56	0.05	0.01	0.24	0.04
Total hardness (mg/L)	28	98	62	156.00	22.53
Chloride (mg/L)	59	6.05	2.55	26.80	3.84
Sulfate (mg/L)	59	33.61	11.37	66.53	12.84
Total dissolved solids (mg/L)	45	143.81	85.5	203.00	33.34
Total suspended solids (mg/L)	46	15.44	<1.0	49.50	12.45
Turbidity (NTU)	57	19.65	1.4	97.00	18.23

Table A-196: WHI0052 White River near Goshen, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	50	9.31	5.36	13.20	2.18
BOD_5 (mg/L)	52	1.27	0.00	5.33	0.89
pH (standard units)	52	7.12	5.97	8.96	0.61
Total Organic Carbon (mg/L)	47	3.14	1.31	7.11	1.44
Ammonia as N (mg/L)	52	0.03	<0.005	0.26	0.04
NO_2+NO_3 as N (mg/L)	52	1.26	0.021	4.86	1.05
Orthophosphate as P (mg/L)	52	0.03	<0.005	0.34	0.06
Total phosphorus as P (mg/L)	48	0.07	0.01	0.39	0.06
Total hardness (mg/L)	26	69.04	31	163.00	31.89
Chloride (mg/L)	53	11.29	1.68	59.10	14.35
Sulfate (mg/L)	53	28.68	5.41	110.48	28.07
Total dissolved solids (mg/L)	41	134.24	65	427.00	91.49
Total suspended solids (mg/L)	40	13.68	2.5	73.00	12.34
Turbidity (NTU)	52	17.44	<1.0	85.00	16.35

Table A-197: WHI0068 Osage Creek Upstream of Berryville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	9.73	5.40	16.00	2.66
BOD_5 (mg/L)	57	0.74	-0.01	2.56	0.50
pH (standard units)	56	7.42	5.49	8.46	0.64
Total Organic Carbon (mg/L)	50	2.32	1.32	3.90	0.64
Ammonia as N (mg/L)	58	0.02	<0.005	0.10	0.02
NO_2+NO_3 as N (mg/L)	58	0.82	0.065	3.42	0.71
Orthophosphate as P (mg/L)	58	0.02	<0.005	0.15	0.03
Total phosphorus as P (mg/L)	54	0.04	0.01	0.21	0.04
Total hardness (mg/L)	28	132.43	58	192.00	32.31
Chloride (mg/L)	59	5.4	1.87	8.08	1.39
Sulfate (mg/L)	59	7.94	3.77	12.68	1.81
Total dissolved solids (mg/L)	47	155.12	98.5	212.00	31.35
Total suspended solids (mg/L)	47	5.4	<1.0	46.00	8.73
Turbidity (NTU)	56	6.83	<1.0	65.00	10.92

Table A-198: WHI0069 Osage Creek Downstream of Berryville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	48	9.36	4.80	15.50	2.89
BOD_5 (mg/L)	49	0.82	0.04	1.95	0.43
pH (standard units)	47	7.56	6.12	8.67	0.62
Total Organic Carbon (mg/L)	45	3.15	1.44	6.66	1.16
Ammonia as N (mg/L)	49	0.02	<0.005	0.20	0.03
NO_2+NO_3 as N (mg/L)	49	1.15	0.042	3.86	0.80
Orthophosphate as P (mg/L)	49	1.53	0.042	8.07	1.97
Total phosphorus as P (mg/L)	45	1.37	0.021	7.80	1.73
Total hardness (mg/L)	22	138	87	185.00	22.93
Chloride (mg/L)	49	23.4	2.04	107.00	21.95
Sulfate (mg/L)	49	13.98	3.74	58.90	9.00
Total dissolved solids (mg/L)	37	250.76	102.5	644.50	121.08
Total suspended solids (mg/L)	37	7.96	<1.0	97.80	18.79
Turbidity (NTU)	48	6.91	<1.0	80.00	14.17

Table A-199: WHI0070 Holman Creek Downstream of Huntsville, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	58	10.35	5.25	16.20	2.38
BOD_5 (mg/L)	57	0.78	0.00	4.67	0.71
pH (standard units)	57	7.65	5.90	8.98	0.59
Total Organic Carbon (mg/L)	51	3.15	1.4	9.28	1.45
Ammonia as N (mg/L)	59	0.08	<0.005	2.65	0.35
NO_2+NO_3 as N (mg/L)	59	4.84	0.394	25.30	4.33
Orthophosphate as P (mg/L)	59	1.73	0.066	7.30	1.54
Total phosphorus as P (mg/L)	55	1.77	0.061	6.55	1.63
Total hardness (mg/L)	27	135.19	41	263.00	49.06
Chloride (mg/L)	57	72.23	6.62	220.00	52.57
Sulfate (mg/L)	60	17.72	5.25	24.00	4.48
Total dissolved solids (mg/L)	47	302.77	97	687.00	146.14
Total suspended solids (mg/L)	47	3.09	<1.0	11.50	2.02
Turbidity (NTU)	57	18.96	<1.0	863.00	113.85

Table A-200: WHI0071 Long Creek Downstream of Denver, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	57	10.35	6.80	14.60	2.09
BOD_5 (mg/L)	57	0.65	0.00	2.60	0.47
pH (standard units)	56	7.64	6.24	8.55	0.48
Total Organic Carbon (mg/L)	51	1.86	<1.0	3.53	0.56
Ammonia as N (mg/L)	58	0.01	<0.005	0.03	0.01
NO_2+NO_3 as N (mg/L)	58	1.8	0.572	3.31	0.58
Orthophosphate as P (mg/L)	58	0.27	0.016	0.56	0.15
Total phosphorus as P (mg/L)	54	0.27	0.022	0.54	0.14
Total hardness (mg/L)	28	152.46	106	193.00	26.70
Chloride (mg/L)	59	12.73	3.72	23.67	5.09
Sulfate (mg/L)	59	9.13	5.88	15.10	1.98
Total dissolved solids (mg/L)	46	200.21	135	240.00	31.70
Total suspended solids (mg/L)	46	3.55	<1.0	34.50	5.14
Turbidity (NTU)	56	4.53	1.1	33.00	5.33

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)	55	9.65	5.04	15.16	2.36
BOD_5 (mg/L)	58	0.42	-0.04	2.11	0.37
pH (standard units)	54	7.58	6.55	11.30	0.70
Total Organic Carbon (mg/L)	52	1.45	<1.0	3.14	0.62
Ammonia as N (mg/L)	60	0.01	<0.005	0.13	0.02
NO_2+NO_3 as N (mg/L)	57	0.92	0.07	3.78	0.78
Orthophosphate as P (mg/L)	60	0.01	<0.005	0.17	0.03
Total phosphorus as P (mg/L)	55	0.04	<0.005	0.36	0.06
Total hardness (mg/L)	28	50.57	34	70.00	9.56
Chloride (mg/L)	59	3.14	1.42	4.67	0.65
Sulfate (mg/L)	59	7.59	3.91	17.50	2.55
Total dissolved solids (mg/L)	46	74.36	51	99.50	12.72
Total suspended solids (mg/L)	47	3.65	<1.0	65.80	10.51
Turbidity (NTU)	57	6.75	<1.0	82.00	11.95

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)	55	9.49	4.03	14.60	2.38
BOD_5 (mg/L)	58	0.54	0.00	1.63	0.44
pH (standard units)	54	7.33	6.23	8.63	0.60
Total Organic Carbon (mg/L)	52	1.49	<1.0	5.24	0.88
Ammonia as N (mg/L)	60	0.01	<0.005	0.10	0.02
NO_2+NO_3 as N (mg/L)	57	0.52	0.013	2.08	0.47
Orthophosphate as P (mg/L)	60	0.01	<0.005	0.11	0.02
Total phosphorus as P (mg/L)	55	0.03	0.01	0.30	0.05
Total hardness (mg/L)	28	26.64	1	119.00	20.93
Chloride (mg/L)	59	2.25	1.36	3.19	0.49
Sulfate (mg/L)	59	7.28	3.04	82.60	10.73
Total dissolved solids (mg/L)	46	46.68	28	92.00	13.58
Total suspended solids (mg/L)	47	4.6	<1.0	76.50	11.36
Turbidity (NTU)	57	10.22	1	120.00	17.28

Table A-203: WHI0116 War Eagle Creek at Hwy 45

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	9.11	5.84	14.00	2.19
BOD_5 (mg/L)	57	0.66	0.00	2.25	0.55
pH (standard units)	55	7.13	5.80	8.09	0.55
Total Organic Carbon (mg/L)	50	1.95	<1.0	4.60	0.77
Ammonia as N (mg/L)	57	0.02	<0.005	0.06	0.02
NO_2+NO_3 as N (mg/L)	57	1.44	0.538	2.89	0.55
Orthophosphate as P (mg/L)	57	0.04	<0.005	0.22	0.03
Total phosphorus as P (mg/L)	54	0.07	0.01	0.24	0.05
Total hardness (mg/L)	28	90.46	43	153.00	28.49
Chloride (mg/L)	57	11.21	2.53	37.00	8.02
Sulfate (mg/L)	57	6.07	3.77	10.49	1.26
Total dissolved solids (mg/L)	47	120.41	73	179.50	29.45
Total suspended solids (mg/L)	47	7.85	<1.0	99.00	16.43
Turbidity (NTU)	56	9.3	1.4	63.00	13.29

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)	59	9.65	5.66	14.00	1.98
BOD_5 (mg/L)	58	0.63	-0.03	1.91	0.47
pH (standard units)	58	7.4	6.05	8.46	0.52
Total Organic Carbon (mg/L)	51	1.82	1.112	3.76	0.53
Ammonia as N (mg/L)	59	0.01	<0.005	0.04	0.01
NO_2+NO_3 as N (mg/L)	59	0.69	0.239	3.53	0.51
Orthophosphate as P (mg/L)	59	0.01	<0.005	0.08	0.02
Total phosphorus as P (mg/L)	55	0.03	0.006	0.11	0.02
Total hardness (mg/L)	28	85.89	1	157.00	35.46
Chloride (mg/L)	61	3.79	2.02	11.00	1.37
Sulfate (mg/L)	61	5.22	2.94	20.80	2.28
Total dissolved solids (mg/L)	47	112.66	66	246.00	35.30
Total suspended solids (mg/L)	47	3.95	<1.0	21.20	4.30
Turbidity (NTU)	57	5.8	1.2	29.00	6.57

Figure A-72: West Fork White River (WHI0051) Turbidity

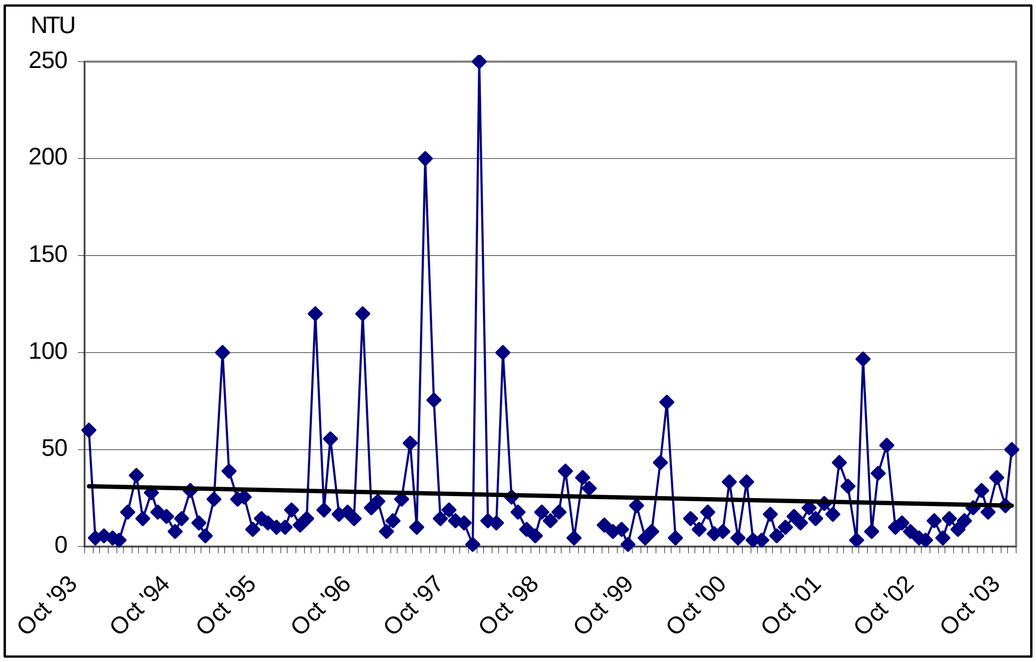


Figure A-73: Kings River and Osage Creek Total Phosphorus, 1995-1998

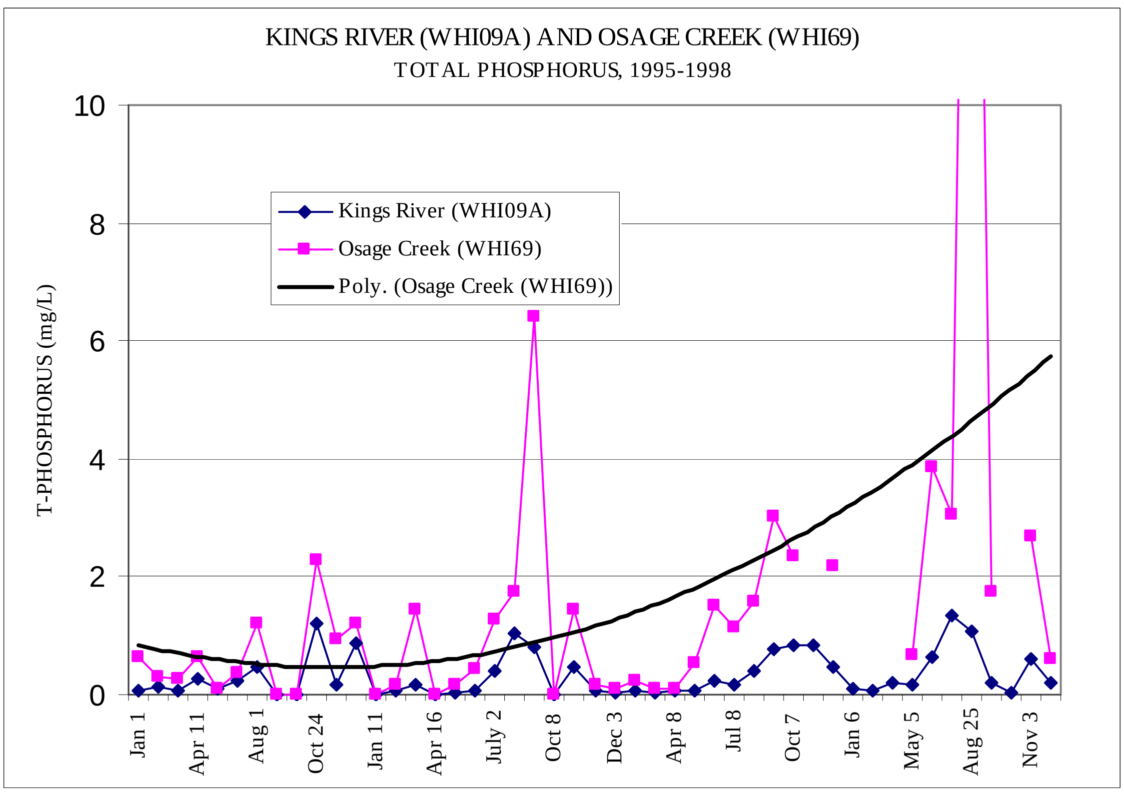
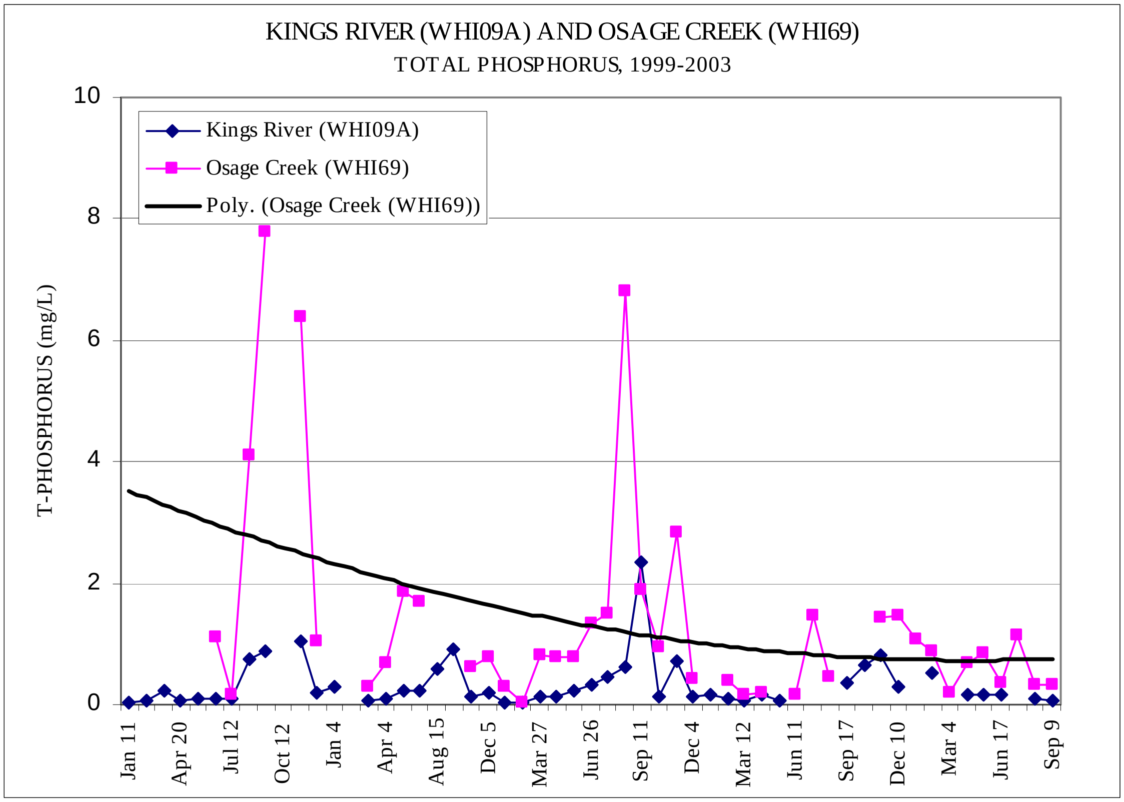


Figure A-74: Kings River and Osage Creek Total Phosphorus, 1999-2003



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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.

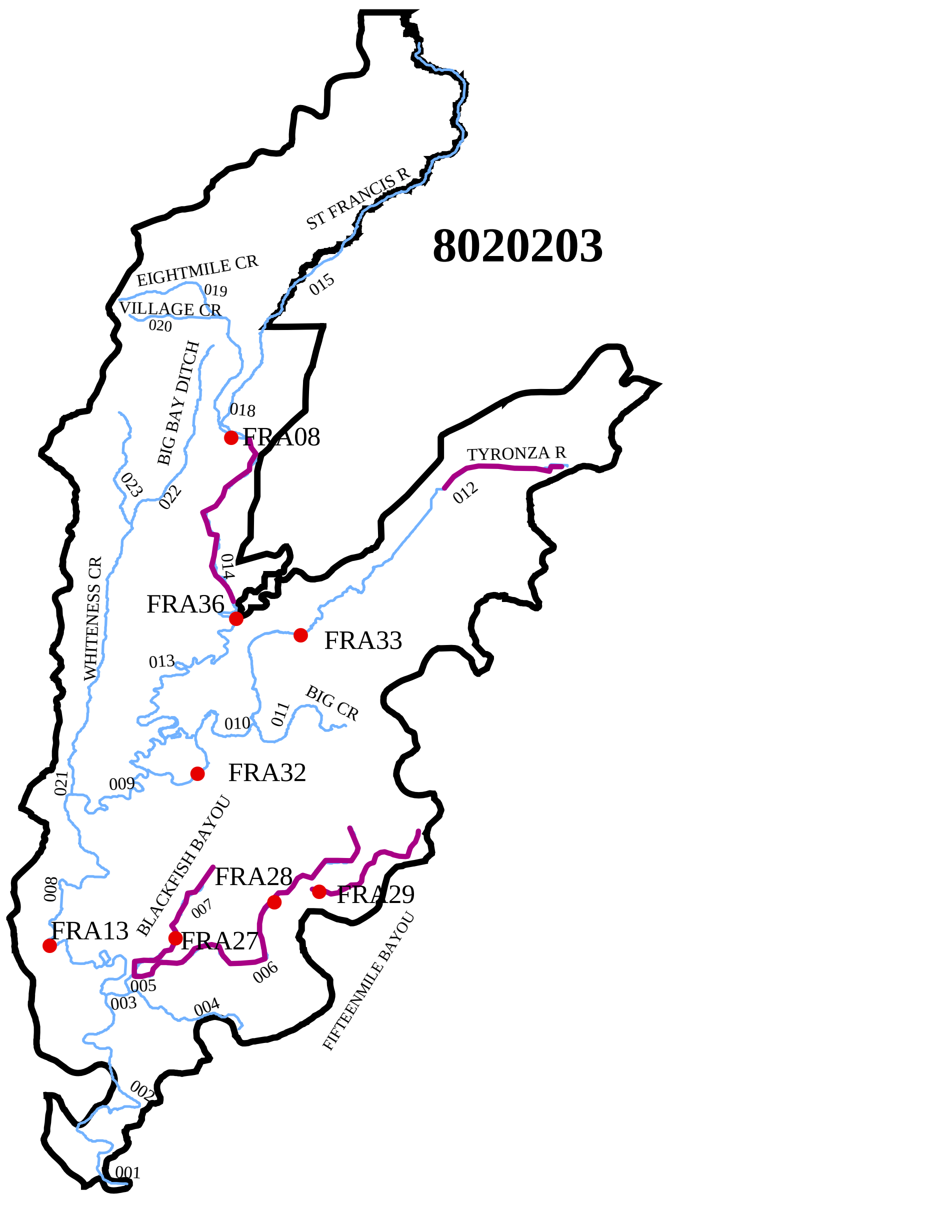
Summary of Water Quality Conditions

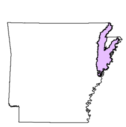
The waters within these segments have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. These three segments are discussed as one unit due to the consistent nature of the water quality. The overriding impact of land use on water quality can be seen in this segment. This basin contains 902.4 stream miles of which approximately 15 percent are designated as outstanding resources. Approximately 69% of the waters within this basin were assessed; 452.1 miles were monitored and 168.9 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.

Portions of Blackfish Bayou, Fifteen Mile Bayou, and the Tyronza River are currently assessed as not maintaining the aquatic life use because of excessive turbidity. These are channel altered streams and future revisions of the water quality standards will be changed to formally categorize them as such.

Figure A-75: Planning Segment 5A – Monitoring Stations



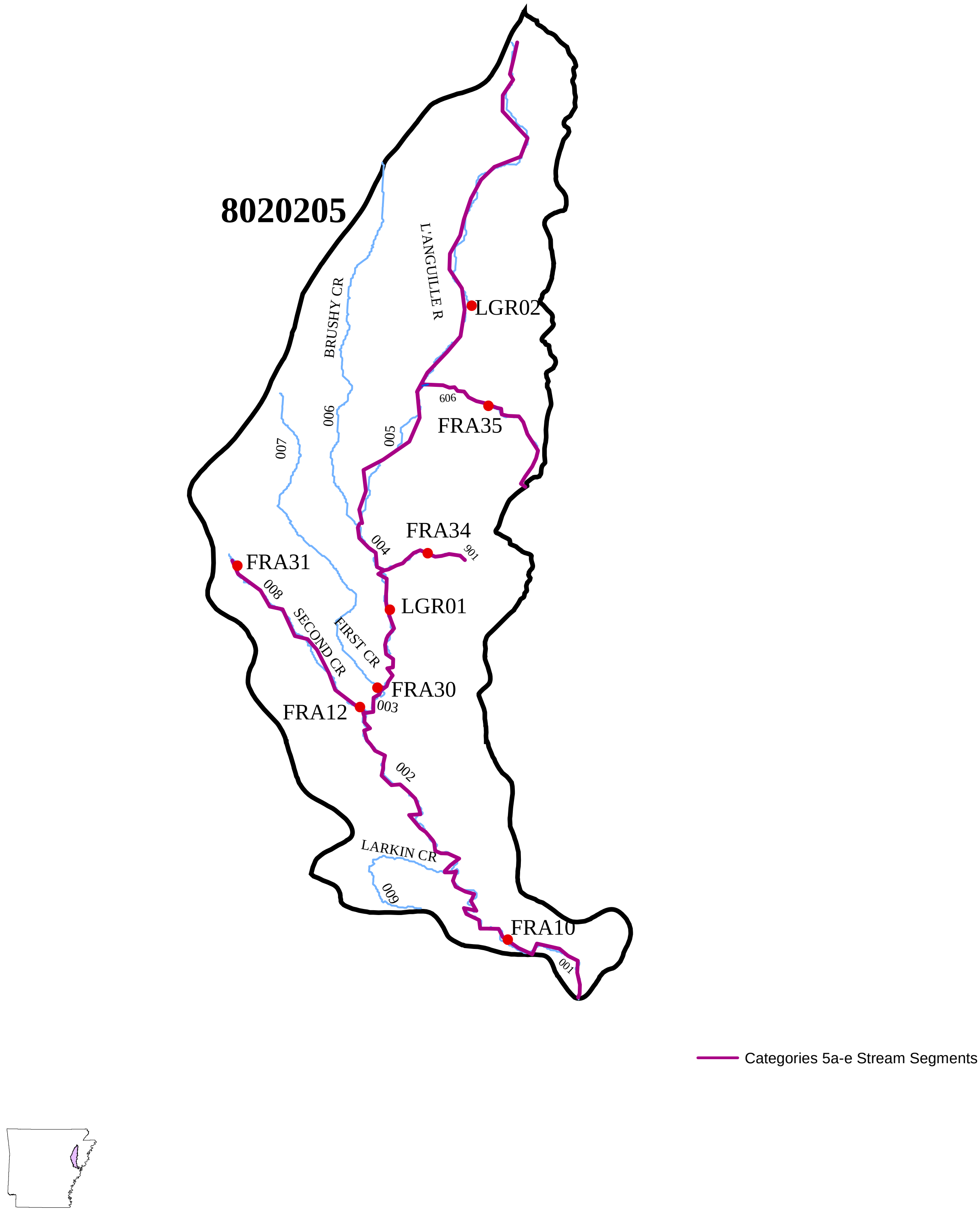


(Segment 5A)

Table A-205: Planning Segment 5A—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-5A																										
St. Francis R.	8020203	-001	11.9		E	S	S	S	S	S	S									1				FISH CONSUMPTION	429.3	0
St. Francis R.	8020203	-002	25.5		E	S	S	S	S	S	S									1				AQUATIC LIFE	279.7	149.6
Blackfish Bayou	8020203	-003	2.4		E	S	N	S	S	S	S	AG				SI				5b				PRIMARY CONTACT	429.3	0
Frenchmans B.	8020203	-004	14.5		U															3				SECONDARY CONTACT	429.3	0
Blackfish Bayou	8020203	-005	2.6		E	S	N	S	S	S	S	AG				SI				5b				DRINKING SUPPLY	429.3	0
Fifteen Mile B.	8020203	-006	38.4	FRA28	M	S	N	S	S	S	S	AG				SI				5b				AGRI & INDUSTRY	429.3	0
Ten Mile Bayou	8020203	-006t	17.3	FRA29	M	S	N	S	S	S	S	AG				DO				5d						
Blackfish Bayou	8020203	-007	16.1	FRA27	M	S	N	S	S	S	S	AG				SI				5b						
St. Francis R.	8020203	-008	55.9	FRA13	M	S	S	S	S	S	S									1						
St. Francis R.	8020203	-009	17.1		E	S	S	S	S	S	S									1						
Tyronza River	8020203	-010	31	FRA32	M	S	S	S	S	S	S									1						
Big Creek	8020203	-011	15.8		U															3						
Tyronza River	8020203	-012	50	FRA33	M	S	N	S	S	S	S	AG				SI				5b						
St. Francis R.	8020203	-013	47.5	FRA36	M	S	S	S	S	S	S									1						
St. Francis R.	8020203	-014	22.8	FRA08	M	S	N	S	S	S	S	UN				DO	Cu			5c	5d					
St. Francis R.	8020203	-015	90.8		E	S	S	S	S	S	S									1						
Eightmile Ditch	8020203	-018	17.8		U															3						
Eightmile Ditch	8020203	-019	12.8		U															3						
Village Creek	8020203	-020	9		U															3						
Whiteness Cr.	8020203	-021	33.6		U															3						
Big Boy Creek	8020203	-022	24.2		U															3						
Whiteness Cr.	8020203	-023	15		U															3						
TOTAL MILES	572																									
MILES UNASSESSED	142.7																									
MILES EVALUATED	150.3																									
MILES MONITORED	279																									

Figure A-76: Planning Segment 5B – Monitoring Stations



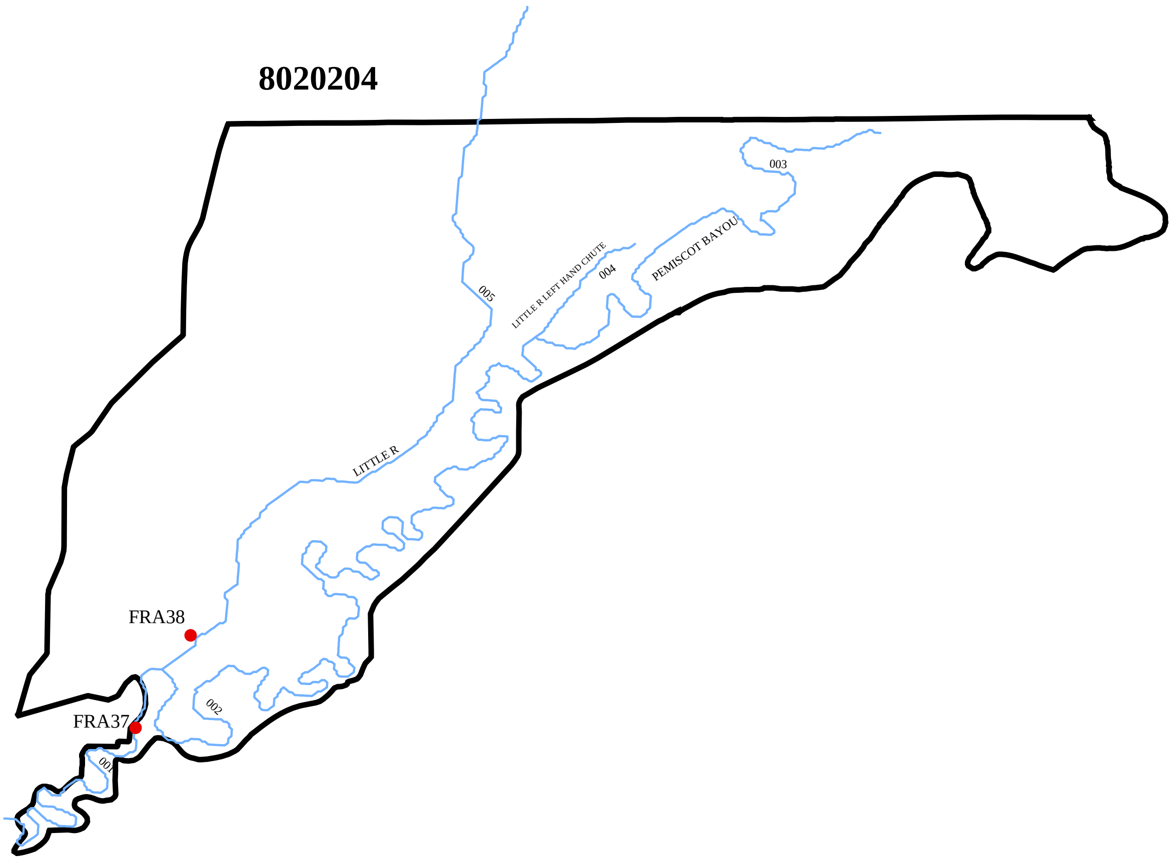
(Segment 5B)

Table A-206: Planning Segment 5B—Designated Use Attainment Status

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	FRA10	M	S	N	S	S	S	N	AG	AG			SI	TDS			4a	5e			FISH CONSUMPTION	164.5	0
L'Anguille R.	8020205	-002	16.8		E	S	N		S	S	N	AG	AG			SI	TDS			4a	5e			AQUATIC LIFE	49.7	114.8
L'Anguille R.	8020205	-003	1.8		E	S	N		S	S	N	AG	AG			SI	TDS			4a	5e			PRIMARY CONTACT	145.9	0
Caney Creek	8020205	-901	9	FRA34	M	S	S	S	S	S	N	AG				TDS				5d				SECONDARY CONTACT	164.5	0
L'Anguille R.	8020205	-004	16	LGR01	M	S	N	S	S	S	N	AG	AG	AG	AG	SI	CL	SO4	TDS	4a	5e	5e	5e	DRINKING SUPPLY	164.5	0
L'Anguille R.	8020205	-005	44.1	LGR02	M	S	N	S	S	S	N	AG	AG	AG		SI	DO	MN*		4a	5d	5e		AGRI & INDUSTRY	44.3	120.2
Prairie Creek	8020205		12.8	FRA35	M	S	S	S	S	S	N	AG	AG	AG		CL	SO4	TDS		5e	5e	5e				
Brushy Creek	8020205	-006	30.7		U															3						
First Creek	8020205	-007	27.9	FRA30	M	S	S	S	S	S	S									1						
Second Creek	8020205	-008	16.4	FRA12+	M	S	N	S	S	S	S	AG				DO				5e						
Larkin Creek	8020205	-009	12.3		U															3						
TOTAL MILES	207.5																									
MILES UNASSESSED	43																									
MILES EVALUATED	18.6																									
MILES MONITORED	145.9																									

MN = Chlorides, Sulfates, and Total Dissloved Solids

Figure A-77: Planning Segment 5C – Monitoring Stations

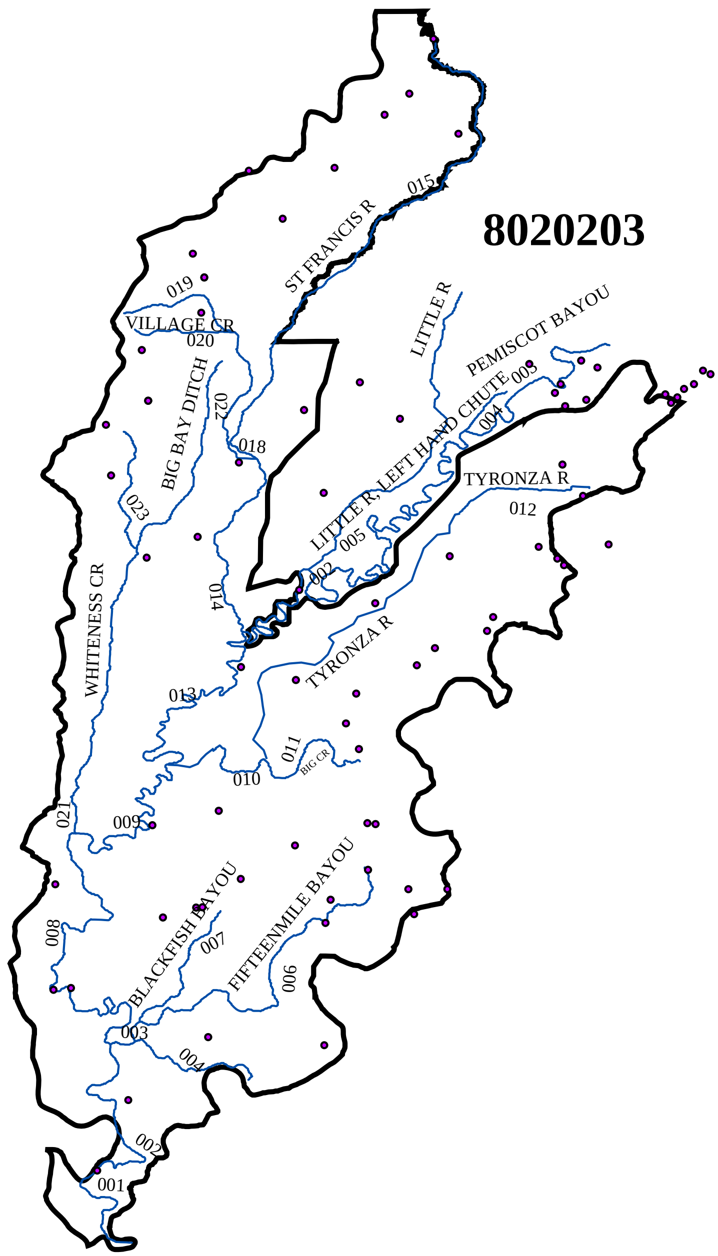


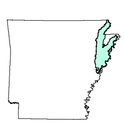
(Segment 5C)

Table A-207: Planning Segment 5C—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-5C																										
Little River Left	8020204	-001	20.3	FRA37	M	S	S	S	S	S	S									1				FISH CONSUMPTION	57.3	0
Little River	8020204	-002	61.7		U															3				AQUATIC LIFE	57.3	0
Pemiscot Bayou	8020204	-003	28		U															3				PRIMARY CONTACT	57.3	0
Little River	8020204	-004	6		U															3				SECONDARY CONTACT	57.3	0
Little River Right	8020204	-005	37	FRA38	M	S	S	S	S	S	S									1				DRINKING SUPPLY	57.3	0
TOTAL MILES	153																							AGRI & INDUSTRY	57.3	0
MILES UNASSESSED	95.7																									
MILES EVALUATED	0																									
MILES MONITORED	57.3																									

Figure A-78: Planning Segment 5A – NPDES Permitted Facilities





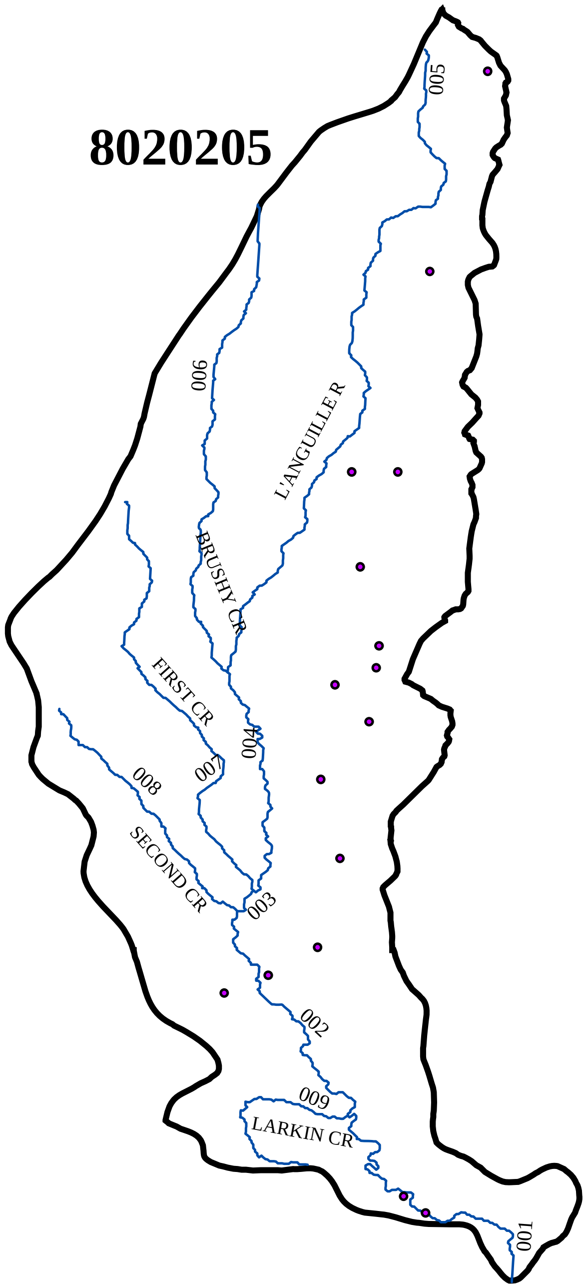
(Segment 5A)

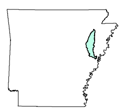
Table A-208: Segment 5A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0021547	HUGHES, CITY OF	CROOKED BAYOU/MILLSEED LAKE/FRENCHMAN BAYOU	8020203	5A
AR0021911	RECTOR, CITY OF	POST OAK CR,BIG SLOUGH DITCH	8020203	5A
AR0021954	TURRELL, CITY OF	BIG CR/TYRONZA R/ST FRANCIS R	8020203	5A
AR0021971	MARION, CITY OF	15-MILE BAYOU	8020203	5A
AR0022152	JOINER, CITY OF	DITCH 4&7/FRENCHMAN’S BAYOU	8020203	5A
AR0022195	CRAWFORDSVILLE, CITY OF	ALLIGATOR BAYOU	8020203	5A
AR0033430	MARKED TREE, CITY OF-POND #2	ST FRANCIS R	8020203	5A
AR0033472	PIGGOTT, CITY OF	BIG SLOUGH DITCH, ST FRANCIS R	8020203	5A
AR0033766	PARAGOULD, CITY LIGHT & WATER	DITCH, 8-MILE CR, ST FRANCIS R	8020203	5A
AR0033588	PARKIN, CITY OF	ST FRANCIS R	8020203	5A
AR0033651	MONETTE, CITY OF	LITTLE DITCH #3	8020203	5A
AR0034134	LAKE CITY, CITY OF	PURCELL SLOUGH (DT 9)	8020203	5A
AR0034304	EARLE, CITY OF	TYRONZA R	8020203	5A
AR0034312	BAY, CITY OF	DITCH #6/MAIN DITCH	8020203	5A
AR0034754	KEISER, CITY OF	DITCH #31, TYRONZA R	8020203	5A
AR0035602	TRUMANN, CITY OF-WWTP	DITCH #60	8020203	5A
AR0035629	MARMADUKE, CITY OF	BIG SLOUGH DITCH	8020203	5A
AR0035637	TYRONZA, CITY OF	TYRONZA R	8020203	5A
AR0036790	GARLOCK RUBBER TECHNOLOGIES	JOHNSON CREEK TRIB	8020203	5A
AR0036897	USA-COE W.G.HUXTABLE PUMP PLAN	ST.FRANCIS R	8020203	5A
AR0037010	VOSS TRUCK PORT	DITCH,TEN MILE BAYOU	8020203	5A
AR0037893	MADISON, CITY OF	ST. FRANCIS R	8020203	5A
AR0037974	BROOKLAND, CITY OF	MAPLE SLOUGH DITCH/ST FRANCIS R	8020203	5A
AR0038202	AR PARKS & TOURISM-VILLAGE CR	VILLAGE CR, CLARK CORNER CUTOFF	8020203	5A
AR0039047	DYESS, CITY OF	TYRONZA R	8020203	5A
AR0042196	NIMMONS, CITY OF	DITCH,HAMPTON SLOUGH	8020203	5A

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0043087	WIDENER, CITY OF	ST. FRANCIS R	8020203	5A
AR0043320	GREENWAY, CITY OF	BIG SLOUGH DITCH TRIB	8020203	5A
AR0043401	JONESBORO CITY WATER & LIGHT-EAST PLANT	WHITEMAN'S CR	8020203	5A
AR0043591	ST FRANCIS, CITY OF	ST FRANCIS R	8020203	5A
AR0044024	BEST HOLIDAY TRAV-L-PARK	DITCH, 15-MILE BAYOU, ST FRANCIS R	8020203	5A
AR0044237	BURDETTE, TOWN OF	DITCH #24,#6,TYRONZA R,ST.FRANCIS R	8020203	5A
AR0044521	HERITAGE HILLS MHP	TRIB-LATERAL #1	8020203	5A
AR0044661	EDMONDSON, CITY OF	15-MI BAYOU,BLACKFISH BAYOU	8020203	5A
AR0044695	SUPER 8 MOTEL	SHELL LAKE,BLACKFISH BAYOU	8020203	5A
AR0044890	NIMOCKS OIL COMPANY, INC.	TRIB,15-MILE BAYOU	8020203	5A
AR0045021	GILMORE, CITY OF	LITTLE CYPRESS DITCH,BIG Cr,GIBSON BAYOU	8020203	5A
AR0045403	TRUCK CENTERS OF AMERICA	DITCH #22,5A-ST FRANCIS R	8020203	5A
AR0045578	AR DEPT OF CORRECTION-EAST AR	ST. FRANCIS R (NEAR ALLIGATOR BAYOU)	8020203	5A
AR0045837	OAK GROVE HEIGHTS, CITY OF	TRIB/LOCUST CR	8020203	5A
AR0045934	BIRDSONG, TOWN OF	SNAKE LAKE,LAMB BAYOU,DITCH#1,...,BIG CR	8020203	5A
AR0046272	BASSETT, CITY OF	DITCH #5 TRIB	8020203	5A
AR0046761	MAPCO EXPRESS, INC-3155 HETH	TRIB/NORTH BLACKFISH BAYOU	8020203	5A
AR0047490	FLASH MARKET	RR DITCH,15-MI BAYOU	8020203	5A
AR0048151	JEANNETTE, CITY OF	BLACKFISH BAYOU, ST FRANCIS R	8020203	5A
AR0049531	HORSESHOE LAKE, CITY OF-WWTF	MISSISSIPPI R	8020203	0.208333333

Figure A-79: Planning Segment 5B – NPDES Permitted Facilities



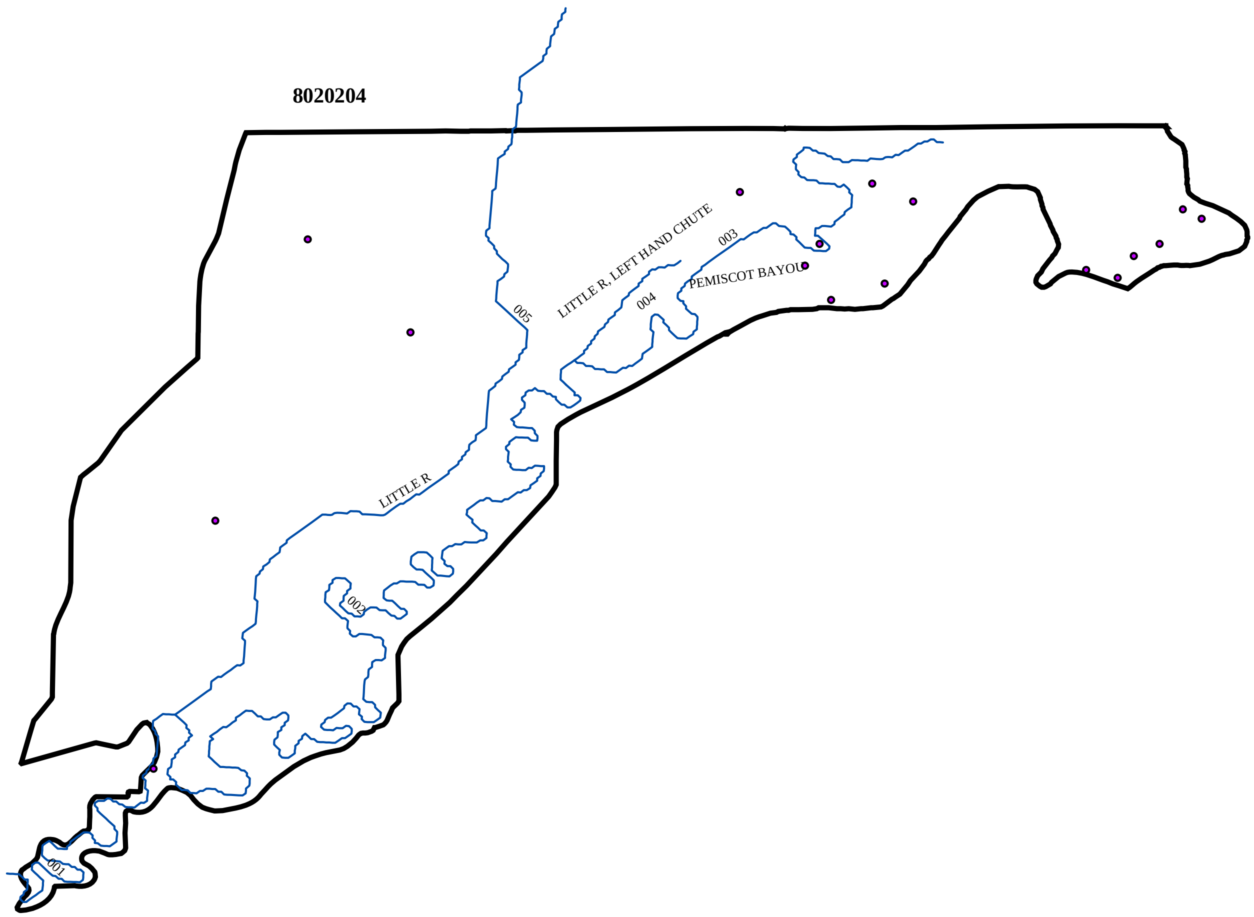


(Segment 5B)

Table A-209: Segment 5B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0000370	ENTERGY AR, INC-HAMILTON MOSES	TRIB,L’ANGUILLE R	8020205	5B
AR0020087	FORREST CITY, CITY OF-WWTP	TRIB,L’ANGUILLE R	8020205	5B
AR0021393	CHERRY VALLEY, CITY OF	COPPER CR,WOLF CR,L’ANGUILLE R	8020205	5B
AR0021903	WYNNE, CITY OF	DITCH,CANEY,CR,L’ANGILLE R	8020205	5B
AR0022632	MUELLER IND, INC	TURKEY CR,L’ANGUILLE R	8020205	5B
AR0033863	HARRISBURG, CITY OF	TOWN CR,LTRL T,HOLLOW BRANCH,L’ANGUILLE	8020205	5B
AR0034142	MARIANNA, CITY OF-POND B	L’ANGUILLE R/ST FRANCIS R	8020205	5B
AR0034169	MARIANNA, CITY OF-POND A	L’ANGUILLE R/ST FRANCIS R	8020205	5B
AR0034720	HICKORY RIDGE, CITY OF	BAYOU DEVIEW	8020205	5B
AR0038679	ANDREWS TRAILER PK	BEAR&CANEY CR/L’ANGUILLE R	8020205	5B
AR0038806	FORREST CITY SCHOOLS-CALDWELL	BIG TELICO CR/SO. HWYS 1 & 261 INTR	8020205	5B
AR0039365	PALESTINE, CITY OF	TRIB-COFFEE CR/L’ANGUILLE R	8020205	5B
AR0041394	POLYONE CORP	TURKEY CR,INDIAN CR,L’ANGUILLE R	8020205	5B
AR0043192	COLT, CITY OF	TAYLOR CR DITCH/L’ANGUILLE R	8020205	5B
AR0044041	CROSS CO SCHOOL DIST #7	COOPER CR,L’ANGUILLE R	8020205	5B
AR0048658	HUNTER GLEN SUBDIVISION	CR, DITCH #1, MULLIGAN LTRL, L’ANGUILLE	8020205	5B
AR0049409	VANNDALE BIRDEYE WATER	LANGUILLE R	8020205	5B
AR0049476	MUELLER COPPER TUBE PRODUCTS	DITCH, INDIAN CR, LANGUILLE R	8020205	5B

Figure A-80: Planning Segment 5C – NPDES Permitted Facilities



(Segment 5C)

Table A-210: Segment 5C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0020028	CARAWAY, CITY OF	DITCH/ASHER & #4 DITCH	8020204	5C
AR0021881	MANILA, CITY OF	DITCH #81/LITTLE R	8020204	5C
AR0021962	GOSNELL, CITY OF	DITCH 29/PEMISCOT BAYOU	8020204	5C
AR0022012	LEACHVILLE, CITY OF	HONEY CYPRESS DT 2/BUFFALO	8020204	5C
AR0022560	BLYTHEVILLE, CITY OF-WEST WWTF	DITCH 27	8020204	5C
AR0022578	BLYTHEVILLE, CITY OF-SOUTH WWP	DITCH,DITCH 17,6,1	8020204	5C
AR0022586	BLYTHEVILLE, CITY OF-NORTH TRE	DITCH, DITCH #30,DITCH #27,L CHUTE LITTLE	8020204	5C
AR0023841	LEPANTO, CITY OF-BOARD OF PUB	LEFT HAND CHUTE,LITTLE R	8020204	5C
AR0039713	ENTERGY AR, INC-BLYTHEVILLE	DITCH #36	8020204	5C
AR0044181	WHEEL ACRES	DITCH 36,PEMISCOT BAYOU	8020204	5C
AR0045977	NUCOR STEEL-ARKANSAS	DITCH38,CROOKED LAKE BAYOU,PEMISCOT BAYOU	8020204	5C
AR0046094	FOX MEADOWS MHP	KRUTZ DITCH TRIB	8020204	5C
AR0046523	MAVERICK TUBE CORP	DITCH #38,CROOKED BAYOU,PEMISCOT BAYOU	8020204	5C
AR0046663	MG INDUSTRIES	DITCH, DITCH 14A, DITCH 13, TYRONZA R	8020204	5C
AR0048178	HUNTCO STEEL, INC	DITCH,DITCH #38 (1,2)-5C & MS R (3)-6C	8020204	5C
AR0049166	IPSCO TUBULARS, INC BLYTHEVILL	DITCH,DITCH #42,CROOKED LAKE BAYOU	8020204	5C
AR0049468	R & S MATERIALS	ROOKER CR, LIGHTHOUSE DITCH, BIG BAY DITCH	8020204	5C

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	6.47	2.71	12.20	2.17
BOD_5 (mg/L)	55	2.09	0.60	6.09	1.15
pH (standard units)	60	7.33	6.17	8.63	0.58
Total Organic Carbon (mg/L)	54	5.63	3.181	16.00	2.28
Ammonia as N (mg/L)	59	0.06	<0.005	0.43	0.08
NO_2+NO_3 as N (mg/L)	58	0.15	<0.01	0.45	0.11
Orthophosphate as P (mg/L)	59	0.09	0.02	0.36	0.07
Total phosphorus as P (mg/L)	53	0.19	0.039	0.71	0.13
Total hardness (mg/L)	29	98.24	16	165.00	35.92
Chloride (mg/L)	59	8.78	3.03	36.20	6.51
Sulfate (mg/L)	59	9.6	5.15	43.30	4.93
Total dissolved solids (mg/L)	45	159.68	101.5	264.00	37.30
Total suspended solids (mg/L)	42	44.13	6.8	343.00	62.32
Turbidity (NTU)	59	48.78	6.56	410.00	69.80

Table A-212: FRA0013 St. Francis River at Hwy 50

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	8.13	3.00	14.45	2.01
BOD_5 (mg/L)	56	1.8	0.28	4.06	0.76
pH (standard units)	54	7.5	6.21	8.60	0.50
Total Organic Carbon (mg/L)	52	5.73	2.19	10.60	1.67
Ammonia as N (mg/L)	57	0.03	<0.005	0.14	0.04
NO_2+NO_3 as N (mg/L)	58	0.15	<0.01	0.86	0.17
Orthophosphate as P (mg/L)	57	0.1	0.035	0.18	0.03
Total phosphorus as P (mg/L)	53	0.22	0.089	0.58	0.11
Total hardness (mg/L)	28	118.11	37	212.00	50.37
Chloride (mg/L)	58	8.78	2.99	25.80	4.74
Sulfate (mg/L)	59	13.88	4.19	31.22	5.88
Total dissolved solids (mg/L)	44	190.24	106.5	318.00	51.28
Total suspended solids (mg/L)	44	53.2	10.3	225.00	51.87
Turbidity (NTU)	57	55.18	7.4	293.00	59.26

Table A-213: FRA0010 L'Anguille River near Marianna, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	55	7.77	2.60	13.48	2.25
BOD_5 (mg/L)	55	2.01	0.34	5.87	1.11
pH (standard units)	54	7.52	6.13	8.90	0.56
Total Organic Carbon (mg/L)	52	6.24	1.08	16.09	2.46
Ammonia as N (mg/L)	56	0.04	<0.005	0.14	0.04
NO_2+NO_3 as N (mg/L)	57	0.19	<0.01	0.67	0.17
Orthophosphate as P (mg/L)	56	0.1	0.006	0.28	0.05
Total phosphorus as P (mg/L)	52	0.25	0.081	0.66	0.13
Total hardness (mg/L)	28	125.11	18	240.00	67.72
Chloride (mg/L)	57	10.46	2.15	43.41	8.03
Sulfate (mg/L)	58	12.78	2.64	29.10	6.48
Total dissolved solids (mg/L)	44	199.16	103.5	359.50	69.75
Total suspended solids (mg/L)	44	58.84	10.5	286.00	60.16
Turbidity (NTU)	56	55.26	7.2	260.00	53.76

Table A-214: FRA0012 Second Creek N. of Palestine, AR

Parameter	Valid Data Points	Mean	Minimum	Maximum	Standard Deviation
Dissolved Oxygen (mg/L)	56	6.09	1.80	10.86	2.18
BOD_5 (mg/L)	55	1.34	0.00	5.84	1.02
pH (standard units)	54	7.25	4.22	8.49	0.71
Total Organic Carbon (mg/L)	52	8.57	5.156	14.50	2.03
Ammonia as N (mg/L)	57	0.03	<0.005	0.29	0.04
NO_2+NO_3 as N (mg/L)	58	0.05	<0.01	0.28	0.06
Orthophosphate as P (mg/L)	57	0.1	0.036	0.32	0.05
Total phosphorus as P (mg/L)	53	0.16	0.06	0.45	0.08
Total hardness (mg/L)	28	127.39	25	314.00	84.61
Chloride (mg/L)	58	32.26	2.92	110.00	26.81
Sulfate (mg/L)	59	6.95	1.18	36.52	6.12
Total dissolved solids (mg/L)	45	228.59	78.5	450.00	108.86
Total suspended solids (mg/L)	45	5.82	<1.0	29.00	5.33
Turbidity (NTU)	57	20.4	1.4	120.00	26.95

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)	28	6.35	0.90	10.90	1.93
BOD_5 (mg/L)	26	2.04	0.60	6.26	1.42
pH (standard units)	28	7.16	5.22	8.02	0.73
Total Organic Carbon (mg/L)	22	8.37	4.99	18.98	2.93
Ammonia as N (mg/L)	28	0.09	<0.005	0.37	0.08
NO_2+NO_3 as N (mg/L)	28	0.25	0.022	0.99	0.23
Orthophosphate as P (mg/L)	28	0.11	0.038	0.20	0.04
Total phosphorus as P (mg/L)	27	0.24	0.108	0.92	0.15
Total hardness (mg/L)	15	127.87	23	258.00	79.93
Chloride (mg/L)	29	16.97	2.37	65.28	14.38
Sulfate (mg/L)	29	12.16	3.63	38.31	9.01
Total dissolved solids (mg/L)	17	228.91	114	374.00	95.89
Total suspended solids (mg/L)	17	26.56	4.5	55.50	16.41
Turbidity (NTU)	29	45.89	7.9	144.00	37.05

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)	27	5.28	1.65	11.50	2.38
BOD_5 (mg/L)	27	4.48	1.54	16.90	3.14
pH (standard units)	26	7.46	5.24	8.53	0.60
Total Organic Carbon (mg/L)	24	10.41	5.76	23.74	4.62
Ammonia as N (mg/L)	27	0.13	<0.005	0.47	0.11
NO_2+NO_3 as N (mg/L)	27	0.18	0.012	1.01	0.23
Orthophosphate as P (mg/L)	27	0.16	0.02	1.27	0.24
Total phosphorus as P (mg/L)	25	0.34	0.104	1.39	0.27
Total hardness (mg/L)	15	126	49	313.00	74.20
Chloride (mg/L)	28	19.88	4.72	45.90	12.17
Sulfate (mg/L)	28	24	4.61	134.00	23.95
Total dissolved solids (mg/L)	14	218.79	106.5	429.50	82.66
Total suspended solids (mg/L)	14	35.47	6	108.00	25.90
Turbidity (NTU)	27	59.29	2.8	196.00	47.69

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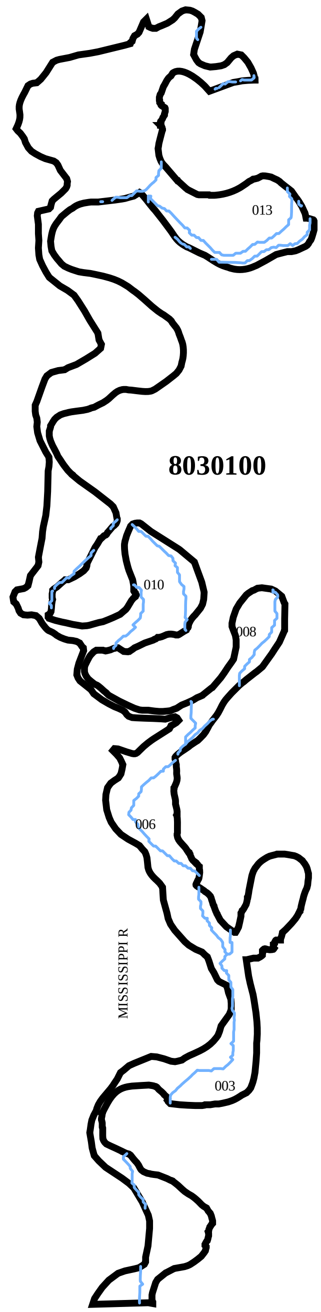
SEGMENTS 6A, 6B, 6C MISSISSIPPI RIVER BASIN

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

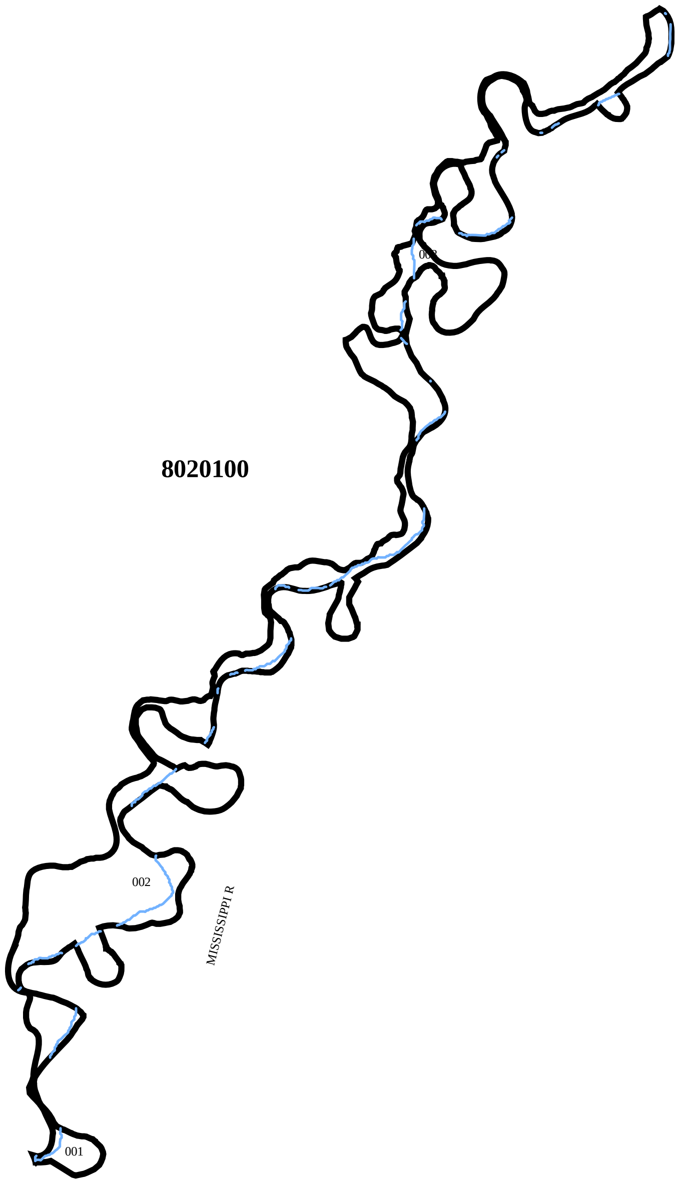
The waters within these segments have been designated as suitable for the propagation of fish/wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. These three segments include 437 miles of the Mississippi River. No recent data was available to assess 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.

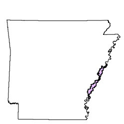
Figure A-81: Planning Segment 6A – Monitoring Stations



(Segment 6A)

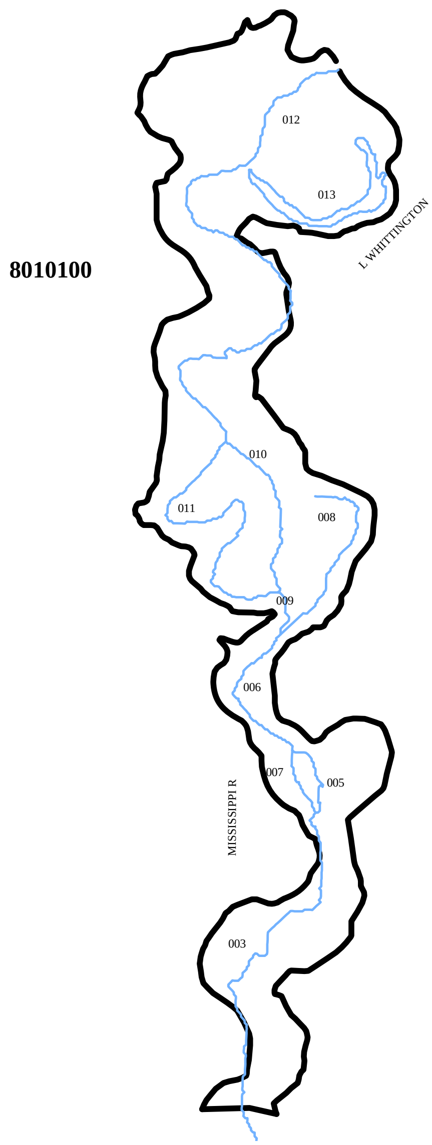
Figure A-82: Planning Segment 6B – Monitoring Stations

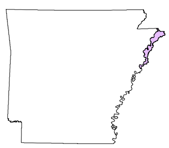




(Segment 6B)

Figure A-83: Planning Segment 6C – Monitoring Stations



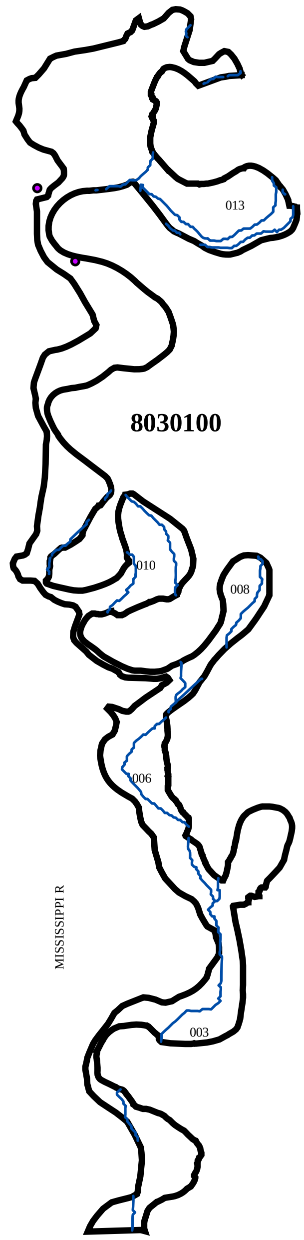


(Segment 6C)

Table A-217: Planning Segment 6A, 6B, 6C—Designated Use Attainment Status

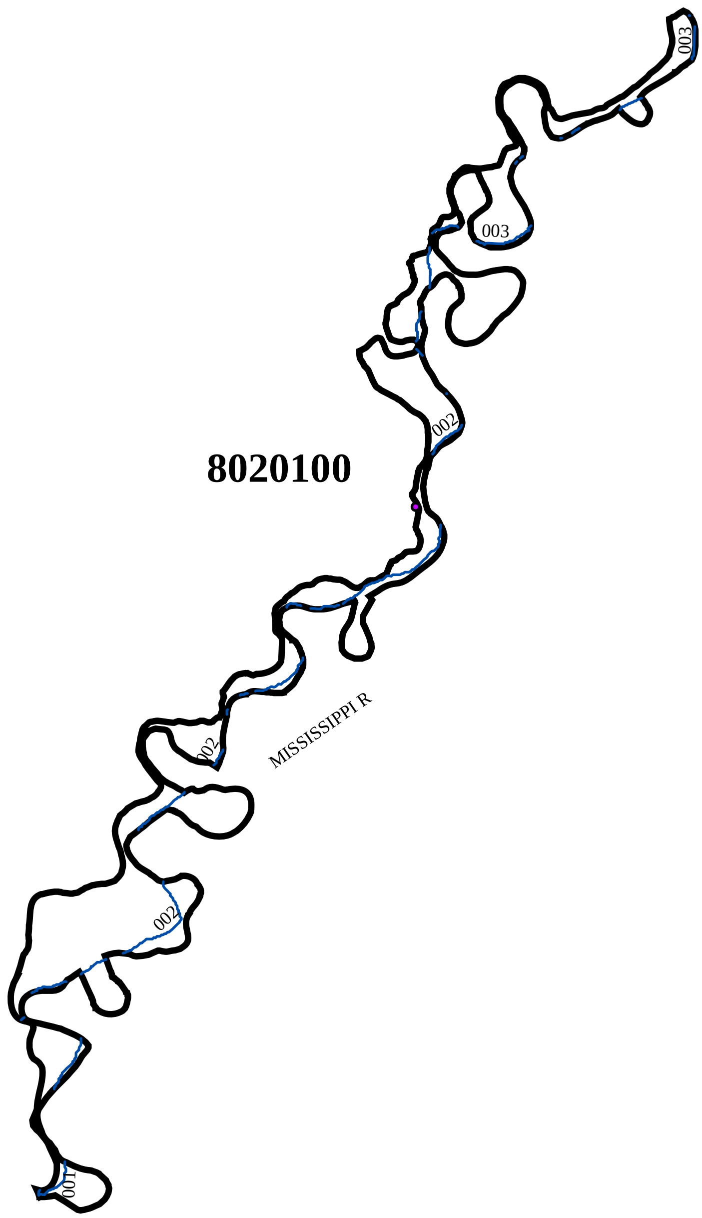
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	SOURCE				CAUSE				STATUS				USE	SUPPORT	NOT SUPPORT
												1	2	3	4	1	2	3	4	1	2	3	4			
SEG-6																										
Mississippi R.	8010100	-001	6.2		U															3				FISH CONSUMPTION	0	0
Mississippi R.	8010100	-002	7.8		U															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		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		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																									
MILES UNASSESSED	437																									
MILES EVALUATED	0																									
MILES MONITORED	0																									

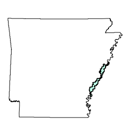
Figure A-84: Planning Segment 6A – NPDES Permitted Facilities



(Segment 6A)

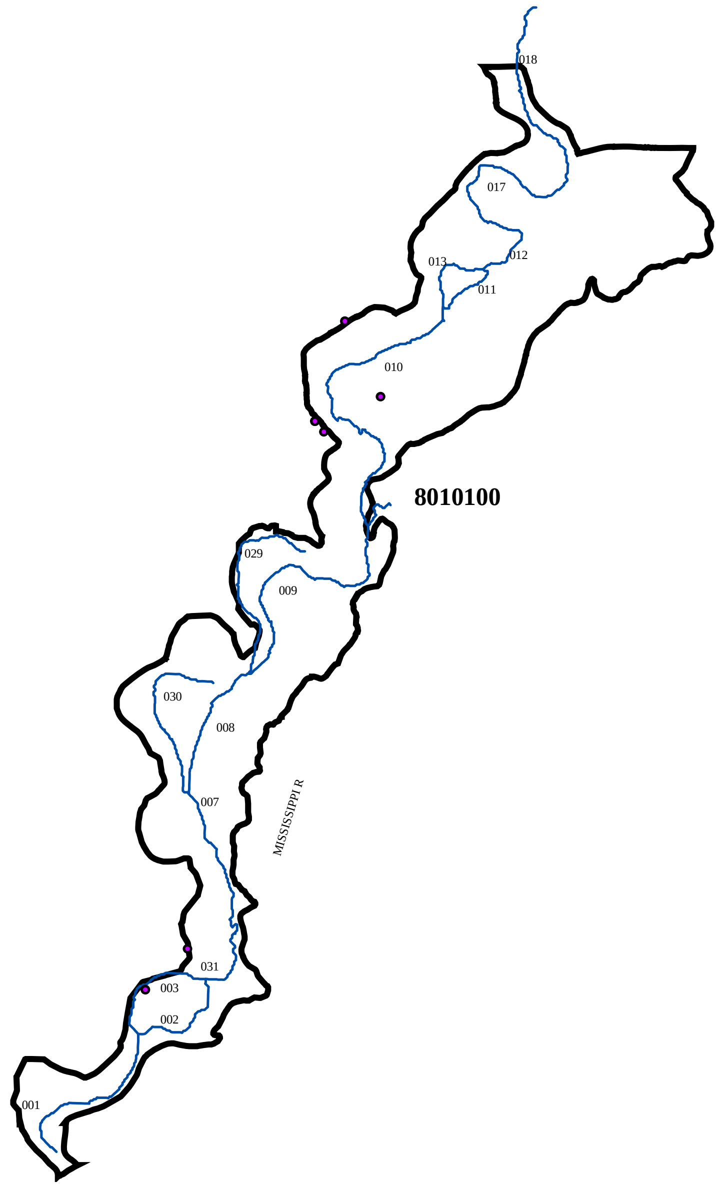
Figure A-85: Planning Segment 6B – NPDES Permitted Facilities

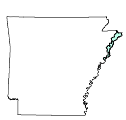




(Segment 6B)

Figure A-86: Planning Segment 6C – NPDES Permitted Facilities





(Segment 6C)

Table A-218: Segment 6A, 6B, 6C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	USGS H.U.C.	Planning Segment
AR0035751	ARKANSAS CITY, CITY OF	MISSISSIPPI R	8030100	6A
AR0035823	POTLATCH CORP-MCGEHEE	MISSISSIPPI R	8030100	6A
AR0000388	ENTERGY AR, INC-RITCHIE PLANT	MISSISSIPPI R (1,2,3) & LONG CR BAYOU (4,5)	8020100	6B
AR0036412	CEDAR CHEMICAL CORPORATION	MISSISSIPPI R	8020100	6B
AR0043389	HELENA, CITY OF	MISSISSIPPI R - SEG. 6B OF MISSISSIPPI R BASIN	8020100	6B
AR0000361	TERRA NITROGEN LTD PARTNERSHIP	MISSISSIPPI R (1) &DITCH #47 (2)	8010100	6C
AR0021580	OSCEOLA, CITY OF	MISSISSIPPI R	8010100	6C
AR0022021	WEST HELENA WATER UTILITIES	MISSISSIPPI R	8010100	6C
AR0022039	WEST MEMPHIS, CITY OF-WWTP	MISSISSIPPI R	8010100	6C
AR0022314	WILSON, CITY OF	MISSISSIPPI R	8010100	6C
AR0033782	LUXORA, CITY OF	MISSISSIPPI R	8010100	6C
AR0036544	VISKASE CORP-OSCEOLA PLANT	MISSISSIPPI R (1) &BIG SANDY SLOUGH-5A (2)	8010100	6C
AR0037770	CIBA SPECIALITY CHEMICALS WT	MISSISSIPPI R	8010100	6C
AR0041831	S-R OF ARKANSAS	MISSISSIPPI R-6C (2) & TYRONZA R-5D (1)	8010100	6C
AR0043117	NUCOR-YAMATO STEEL CO-ARMOREL	MISSISSIPPI-6C (1) & DITCH #14A-5D (2)	8010100	6C
AR0045101	FRUIT OF THE LOOM, INC	MISSISSIPPI R	8010100	6C
AR0049557	PLUM POINT ENERGY ASSOCIATES,	MISSISSIPPI R	8010100	6C

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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 2004. 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	08/13/03	03N02W08ABB2	34 53 47.4	91 13 55.7	60’	Alluvial	D
MON116	08/13/03	03N02W10CCC3	34 52 55.6	91 12 19.2	160’	Alluvial	I
MON121	07/08/03	03N02W22ACC1	34 51 43.2	91 11 43.9	65’	Alluvial	I
MON122	07/08/03	03N02W23CDC2	34 51 14.3	91 11 04.6	100’	Alluvial	D
MON129	07/08/03	03N02W27DAD2	34 50 36.5	91 11 30.1	90’	Alluvial	D
MON304	07/08/03	04N02W14CDC3	34 57 17.9	91 10 54.1	110’	Alluvial	D
MON310	07/07/03	02N02W14ACB2	34 47 23.6	91 10 51.5	140’	Alluvial	I
MON318	07/08/03	04N02W28DAC	34 55 47.6	91 12 28.0	121’	Alluvial	I
MON324	07/07/03	02N02W34ACB2	34 44 45.5	91 12 03.0	-	Alluvial	I
MON325	07/07/03	02N03W35ADD3	34 44 47.2	91 17 00.8	-	Alluvial	I
MON326	07/07/03	02N03W26DDA2	34 45 20.0	91 16 59.8	-	Alluvial	I
MON327	08/13/03	03N02W16CDD4	34 52 04.6	91 12 54.9	-	Alluvial	I
MON329	07/07/03	03N01W19BAB2	34 51 60.0	91 08 55.4	80’	Alluvial	D
MON330	07/07/03	02N01W05ADA4	34 49 04.6	91 07 07.8	140’	Alluvial	I
MON331	07/07/03	03N01W33BCC2	34 49 54.0	91 07 03.4	100’	Alluvial	I
MON332	07/07/03	03N01W19DCC4	34 51 10.9	91 08 34.1	130’	Alluvial	I
MON334	07/07/03	02N02W04BBC3	34 49 17.7	91 13 28.5	-	Alluvial	I
MON335	07/07/03	02N02W06AAC1	34 49 20.3	91 14 44.3	-	Alluvial	I
MON900	07/07/03	03N02W16AAC3	34 52 42.8	91 12 35.0	-	Alluvial	I
MON901	07/07/03	02N02W18CDD4	34 46 51.9	91 15 13.2	-	Alluvial	I
MON902	07/07/03	02N02W07DDA4	34 47 50.0	91 14 38.5	-	Alluvial	I
MON903	07/07/03	02N02W07DCD4	34 47 43.6	91 14 53.8	-	Alluvial	I
MON904	07/08/03	02N02W17ACC4	34 47 16.2	91 14 00.1	-	Alluvial	I
MON905	07/08/03	04N02W21CDA4	34 56 33.7	91 12 46.6	-	Alluvial	I
MON906	07/08/03	04N02W27ABC3	34 56 12.4	91 11 44.2	-	Alluvial	I
MON907	07/08/03	-	34 55 44.6	91 11 37.6	-	Alluvial	I
MON908	07/08/03	03N02W22ACC1	34 51 42.9	91 11 44.9	175’	Alluvial	I
MON909	08/13/03	-	34 56 16.7	91 15 04.2	-	Sparta	P
MON910	08/13/03	02N02W14AAB1	34 47 37.9	91 10 34.1	-	Alluvial	I
MON911	08/13/03	02N02W15BAB2	34 47 41.0	91 12 12.3	-	Alluvial	I

Table B-2: Brinkley Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conduc -tivity	TDS	Alka- linity	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	7.57	853	490	265.8	324.3	0.399	0.014	0.025	-	12.2	182	71.4	108	3620	0.36	2.18	22.9	318	69.3	-
MON116	7.24	904	537	406.9	496.4	0.444	0.015	0.02	-	35.6	275	111	33.7	2900	0.27	2.15	34.6	353	35.3	-
MON121	7.11	1043	633	326.8	398.7	0.676	<0.010	<0.005	-	54.8	385	125	80.8	3290	0.27	2.08	36.6	359	50.9	34.2
MON122	7.39	1037	625	340.6	415.5	0.711	<0.010	<0.005	-	48.6	356	137	75.2	2720	0.26	2.99	38	313	43	31.2
MON129	7.16	1148	741	349.9	426.9	0.74	<0.010	<0.005	-	126	287	156	53.5	3860	0.29	3.07	45.6	602	39.5	32.8
MON304	6.54	17.6	677	344.5	420.3	0.47	<0.010	0.099	-	131	167	100	48.2	1500	0.3	1.42	33.4	878	98	31.8
MON310	7.2	1962	1210	358.6	437.5	1.05	0.011	<0.005	-	120	448	161	313.5	4130	0.3	4.58	55.4	503	173	30.3
MON318	7.38	1149	672	365.3	445.7	0.501	0.013	0.551	-	9.99	157	27.7	153	748	1.56	3.92	8.15	101	216	20.7
MON324	7.16	778	504	273.1	333.2	0.253	<0.010	<0.005	-	68.3	531	98.5	23.1	4440	0.34	3.35	30.6	944	22.6	48.9
MON325	7.1	754	485	216.6	264.3	0.202	<0.010	<0.005	-	54.8	643	94.6	69.4	5770	0.29	2.55	20.9	119 0	27.5	44.4
MON326	7.12	865	561	221.5	270.2	0.344	<0.010	<0.005	-	77	706	106	70.7	4630	0.25	3.59	28.4	735	25.1	39.6
MON327	7.28	720	436	312.2	380.9	0.572	0.017	0.037	-	33.5	206	84	27.8	2020	0.28	1.76	25.5	264	27.4	-
MON329	7.05	759	461	301	367.2	0.548	<0.010	<0.005	-	28.6	277	104	16.1	3340	0.32	0.81	31	397	24.4	35.6
MON330	7.12	974	608	309	377.0	0.702	<0.010	<0.005	-	94.4	441	125	27.1	4940	0.29	2.33	39.4	651	37.6	32.9
MON331	7.15	747	448	316.6	386.3	0.213	<0.010	<0.005	-	24.8	237	98.1	14.1	2060	0.26	1.79	30	491	29.1	34.4
MON332	7.16	753	468	281.5	343.4	0.504	<0.010	<0.005	-	49.3	303	94.7	27.7	2910	0.26	1.3	30.6	546	22.5	36.9
MON334	7.14	1346	778	352	429.4	0.946	0.011	<0.005	-	24.5	351	77.4	155	3140	0.27	2.22	25.6	242	34.2	32.6
MON335	7.23	705	419	248.7	303.4	0.5	0.016	<0.005	-	30.5	559	120	40.6	4790	0.3	4.02	36.7	477	124	33.7
MON900	7.08	988	603	311.6	380.2	0.582	<0.010	0.011	-	59.4	325	126	47.6	3010	0.28	2.1	38	403	40.7	36.6
MON901	7.04	1763	1040	342.5	417.9	1	<0.010	<0.005	-	68.9	954	163	262.08	7120	0.24	6.39	50.1	619	141	38.3
MON902	7.16	1790	1030	316.2	385.8	1.23	<0.010	<0.005	-	54	722	131	311.06	5070	0.32	5.46	41	356	180	34.2
MON903	7.15	2310	1290	331.6	404.6	1.42	<0.010	<0.005	-	17.7	743	142	481	5050	0.3	6.66	41.7	346	269	32.1
MON904	7.09	2440	1420	324.4	395.8	1.21	<0.010	<0.005	-	23.3	1130	180	535	8390	0.27	7.01	58.2	403	226	35.7
MON905	7.3	411	247	211.6	258.2	0.719	0.012	0.032	-	3.71	256	36.4	9.7	747	0.31	2.35	14.7	55.1	29.2	17.4
MON906	6.92	697	427	327.4	399.4	0.379	<0.010	0.041	-	6.83	186	62.5	24.2	1250	0.32	2.57	18.1	345	73.4	31.4
MON907	7.22	1572	874	353.6	431.4	0.616	<0.010	0.041	-	13.4	302	87.4	291.28	1240	0.3	3.74	24.4	425	213	31.8

Sample ID	pH	Conduc-tivity	TDS	Alka-linity	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
MON908	7.24	1250	761	317	386.7	0.753	<0.010	0.009	-	50.2	403	122	155	2300	0.26	2.79	34.9	300	106	32.2
MON909	7.97	750	440	219.8	268.2	0.443	<0.010	0.476	-	2.16	25.5	2.21	116	63	0.72	1.49	0.52	3.38	166	17.8
MON910	7.31	1659	957	451.7	551.1	0.984	0.014	0.021	-	77.2	331	125	140	2920	0.31	3.21	41.3	414	156	-
MON911	7.32	2200	1210	438.2	534.6	1.12	0.016	0.017	-	42.2	485	160	416	4680	0.26	4.73	52.6	579	194	-
Min.	6.54	17.6	247	211.6	258.2	0.202	<0.010	<0.005	-	2.16	25.5	2.21	9.7	63	0.24	0.81	0.52	3.38	22.5	17.4
Max.	7.97	2440	1420	451.7	551.1	1.42	0.017	0.551	-	131	1130	180	535	8390	1.56	7.01	58.2	1190	269	48.9
Mean	7.20	1144.8	701.7	317.9	387.8	0.674	0.008	0.047	-	48.10	412.5	107.6	137.55	3421.6	0.35	3.15	33.0	453.7	96.5	33.1

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	Conduc-tivity	TDS	Alka-linity	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	0.01	0.015	0.44	25	623.5	102	220	4620	0.41	3.9	30.8	284	136.4	-
CHI002	8.1	1480	1116	248	302.56	0.961	0.01	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	314.76	1.005	0.01	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	448.96	0.701	0.01	0.015	0.56	45	416	212	460	13200	0.17	6.2	45.4	552	207.9	-
CHI005	6.95	898	2944	394	480.68	0.949	0.01	0.015	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	0.01	0.015	0.85	145	561	129	340	8000	0.34	2.9	54.5	1460	204.4	-
CHI009	7.08	2970	2064	422	514.84	0.751	0.01	0.015	0.59	161	495.3	237	890	8010	0.2	7.4	70.6	692	450.9	-
CHI010	7.16	1264	894	419	511.18	0.266	0.01	0.015	0.26	200	160.9	129	82.532	3450	0.21	2.3	49.5	532	100.9	-
CHI011	7.05	2730	2086	376	458.72	0.578	0.01	0.015	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	0.01	0.015	0.48	200	100	247	780	8470	0.19	5.1	88.2	1090	354.3	-
CHI013	6.91	1410	831	306	373.32	0.637	0.01	0.032	0.75	84	781	149	260	14900	0.2	5.1	28.7	902	104.2	-
CHI014	7.24	1320	815	342	417.24	0.424	0.01	0.015	0.53	34	373.3	140	250	8130	0.24	3.3	27.4	530	127.2	-
CHI015	6.99	2920	2043	404	492.88	1.028	0.01	0.015	0.61	189	428	284	840	14200	0.18	3.6	74	1400	288	-
CHI016	7.01	2290	1597	334	407.48	0.728	0.01	0.015	0.4	200	320	276	570	6400	0.24	3.2	76	1070	183	-
CHI017	7.1	2360	1421	338	412.36	0.836	0.01	0.045	0.76	70	668	154	630	9000	0.28	3.6	45	1260	244	-
CHI018	7.19	2510	1816	374	456.28	0.989	0.01	0.015	0.44	-	485.6	270	700	7740	0.2	5.6	77.9	999	286.5	-
CHI019	7.35	2770	1922	466	568.52	1.026	0.01	0.015	0.61	145	699.2	207	780	6460	0.28	5.6	62.7	1080	502.7	-
CHI020	6.97	947	690	336	409.92	0.573	0.01	0.015	0.65	46	724.2	111	180	6610	0.28	3.5	30.1	248	86.8	-
CHI021	7.13	1072	669	348	424.56	0.405	0.01	0.015	0.52	30	409.6	109	170	6560	0.23	3.2	25.6	383	89.9	-
CHI022	7.14	671	434	266	324.52	0.169	0.01	0.015	0.31	30	295.8	84.3	48.473	4710	0.2	2.7	18.6	880	29.4	-
CHI023	7.15	736	445	290	353.8	0.367	0.01	0.015	0.66	17	422.9	90.3	68.016	5160	0.31	2.4	20	532	37	-
CHI024	7.07	1406	1115	337	411.14	0.728	0.01	0.015	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	0.015	0.36	90	935.4	196	390	10500	0.16	5.3	44.3	776	127	-
CHI026	6.76	1884	1693	397	484.34	0.531	0.01	0.031	0.26	154	522	239	640	11100	0.16	4.7	56.2	836	243.6	-
CHI027	7.04	1990	1773	388	473.36	0.752	0.01	0.034	0.5	174	332.9	226	690	8590	0.25	6.1	81	688	277.5	-
CHI028	-	2770	3132	446	544.12	1.14	0.01	0.034	0.78	145	1138	313	1460	12200	0.22	8.6	141	1420	620.9	-
Min.	6.56	671	434	248	302.56	0.169	0.01	0.015	0.17	8	68.3	6	48.473	52	0.16	2.3	1.4	6	29.4	-
Max.	8.1	2970	3132	466	568.52	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: ElDorado Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
UNI008	06/05/01	17S15W32BDD1	33 11 42.0	92 40 47.0	712	El Dorado	C/I
UNI010	06/04/01	18S15W16ACB1	33 09 37.0	92 39 22.5	295	Greensand	D
UNI011	06/05/01	17S16W24BBC1	33 14 02.5	92 42 58.5	704	El Dorado	M
UNI015	06/05/01	18S16W01DBC1	33 11 02.0	92 42 25.5	770	El Dorado	C/I
UNI021	06/04/01	17S15W16BBA1	33 15 01.5	92 39 44.5	37	Cockfield	C/I
UNI023	06/04/01	16S16W34BDD1	33 17 21.5	92 44 38.0	56	Cockfield	D
UNI024	06/04/01	17S15W09BBB1	33 15 54.0	92 39 54.5	550	El Dorado	C/I
UNI026	06/04/01	17S14W14DBC1	33 14 17.0	92 31 03.0	49	Cockfield	D
UNI027	06/04/01	18S14W07BBA1	33 10 37.0	92 35 16.0	783	El Dorado	M
UNI028	06/04/01	17S14W32CBB1	33 11 53.0	92 34 28.5	120	Cockfield	D
UNI029	06/04/01	16S16W34BDD2	33 17 19.5	92 44 43.5	300	Greensand	D
UNI061	06/04/01	18S15W21DAC1	33 08 23.0	92 39 08.0	40	Cockfield	D
UNI062R	06/04/01	-	-	-	-	Cockfield	C/I
UNI063	06/04/01	18S15W20BDC1	33 08 37.0	92 40 44.5	320	Greensand	D
UNI094	06/05/01	18S16W02AAA1	33 11 35.5	92 43 04.5	43	Cockfield	D
UNI099	06/05/01	18S16W11CDD1	33 09 53.5	92 43 37.0	70	Cockfield	D
UNI116	06/04/01	17S16W01CCC1	-	-	-	El Dorado	C/I
UNI117	06/05/01	-	-	-	700	El Dorado	M
UNI118A	06/05/01	-	33 12 27.5	92 39 37.1	746	El Dorado	M
UNI119	06/05/01	17S15W22CCD1	33 13 23	92 38 43	330	Greensand	D
UNI120	06/04/01	18S15W27AAB	-	-	662	El Dorado	C/I
UNI121	06/04/01	18S15W21DAC2	33 08 22	92 39 09	310	Greensand	D
UNI122A	06/05/01	-	-	-	566	El Dorado	C/I

Table B-6: ElDorado Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conduc-tivity	TDS	Alka-linity	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
UNI008	-	-	362	153	186.66	0.348	<0.010	0.078	-	47.31	11	6.9	69.9	280	0.25	1.9	1.4	90.2	125	11.8
UNI010	8.27	282	169	141.5	172.63	0.72	0.014	0.115	-	3.2	62.7	9.3	2.03	35.4	0.08	3.2	1.9	22.3	52.6	11.9
UNI011	8.63	430	254.5	183	223.26	0.429	0.01	0.269	-	0.83	<8.8	0.8	22.82	<15	0.24	2	<0.13	6.5	98	11.4
UNI015	8.56	559	323	190	231.8	0.554	0.01	0.202	-	23.84	<8.8	1.5	40.11	<15	0.26	2.3	<0.13	2.1	126	11.5
UNI021	5.79	136	102.5	23.5	28.67	<0.005	0.052	0.008	-	27.39	72.3	6.5	3.83	219	0.05	3.3	2.9	52.7	11.9	23
UNI023	6.51	136	121	34.5	42.09	<0.005	0.113	0.021	-	4.49	35.7	7.1	14.79	585	0.11	3.9	3.3	90.2	10.5	49.6
UNI024	8.53	429	264	184	224.48	0.495	0.011	0.203	-	0.81	<8.8	1.1	25.52	<15	0.17	1.8	<0.13	8	104	11.4
UNI026	5.78	49	67	15	18.3	<0.005	0.164	0.015	-	3.34	34	3.5	2.73	334	0.08	1.4	0.6	5.3	3.3	35.5
UNI027	8.65	728	416	201.5	245.83	0.568	0.026	0.207	-	31.81	<8.8	1	81.28	<15	0.26	1.5	<0.13	0.6	157	11.7
UNI028	6.37	125	125.5	19.5	23.79	0.02	<0.010	0.097	-	3.26	52.1	4.3	15.92	795	0.09	2.8	1.5	26.2	15.2	60.7
UNI029	7.96	313	192.5	170	207.4	0.479	<0.010	0.05	-	1.41	101.6	14.1	2.43	103	0.1	4.8	3	24.5	55.3	15.7
UNI061	6.87	124	99	53.5	65.27	0.013	0.108	0.014	-	4	48.6	18.1	1.76	265	0.09	1.4	0.4	68.4	3.3	18
UNI062R	6.35	293	147.5	107.5	131.15	0.304	0.431	<0.005	-	3.67	291.6	19.7	11.25	10400	0.08	10.1	9.7	2398	6.4	10.4
UNI063	8.01	284	170	142	173.24	0.935	<0.010	0.192	-	3.15	53.8	7.7	2.59	54	0.09	3.1	1.7	19.7	54.7	12.6
UNI094	6.24	425	328	50	61	<0.005	0.102	0.213	-	44.63	28.2	12.6	59.75	20.9	0.13	1.7	2.3	0.7	64.1	82.2
UNI099	5.91	67	67	9	10.98	<0.005	3.746	0.005	-	0.88	45.6	3.9	4.11	<15	0.03	2.9	1.5	58.5	3.2	11.7
UNI116	8.71	431	258.5	185.5	226.31	0.432	<0.010	0.245	-	0.85	<8.8	0.4	22.99	<15	0.221	1.6	<0.13	5.1	105	11.7
UNI117	8.45	480	278	191	233.02	0.518	0.012	0.236	-	0.82	11.1	2.1	35.22	<15	0.21	2.7	0.3	8.3	106	11
UNI118A	8.55	630	352	186	226.92	0.597	<0.010	0.212	-	1.46	13.5	2.2	81.7	15.3	0.25	2.1	0.3	5	138	11.7
UNI119	8.24	287	177	145	176.9	0.689	0.011	0.17	-	3.03	63.7	8.2	2.27	66.3	0.1	3.3	2	22.2	55.4	12.5
UNI120	8.79	632	361.5	191	233.02	0.534	<0.010	0.221	-	28.25	<8.8	0.8	58.4	<15	0.24	2.8	<0.13	0.9	139	11.7
UNI121	8.14	305	186	151.5	184.83	0.787	0.013	0.318	-	2.06	85.6	11.7	4.21	28	0.07	3.5	2.5	21	53.7	15.4
UNI122A	8.58	504	293.5	191.5	233.63	0.477	0.031	0.216	-	8.58	<8.8	1	32.92	16	0.27	1.5	<0.13	5.1	113	11.1
Min.	5.78	49	67	9	10.98	<0.005	<0.010	0.0025	-	0.81	<8.8	0.4	1.76	<15	0.03	1.4	<0.13	0.6	3.2	10.4
Max.	8.79	728	416	201.5	245.83	0.935	3.746	0.318	-	44.63	291.3	19.7	81.7	10400	0.27	10.1	9.7	2898	157	82.2
Mean	7.63	347.68	222.39	126.91	154.83	0.39	0.21	0.14	-	10.81	45.29	6.28	26.02	577.26	0.15	2.85	1.55	149.63	69.59	20.62

Table B-7: Hardy Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
FUL001	03/11/03	19N06W30BBC1	36 16 46.4	91 40 20.4	368	Cotter	D
FUL002	03/11/03	19N07W36AAB1	36 16 03.6	91 40 39.8	1050	Roubidoux	M
FUL003	03/11/03	20N07W26DAA1	36 21 44.7	91 41 30.3	200	Cotter-Jefferson City	D
FUL004	03/11/03	21N07W35DAA1	36 26 04.9	91 41 30.9	-	-	D
FUL005	03/11/03	21N06W12ACD1	36 29 30.5	91 34 10.0	220	Cotter-Jefferson City	D
FUL007	03/10/03	19N06W36CCD1	36 15 04.5	91 34 50.6	160	Cotter-Jefferson City	D
FUL010	03/11/03	21N06W18CBD1	36 28 34.6	91 40 07.2	760	Roubidoux	D
FUL011	03/11/03	20N06W33BBD1	36 21 05.5	91 38 03.0	160	Cotter-Jefferson City	D
FUL099	03/11/03	-	-	-	70	Cotter	D
SHA001	03/10/03	17N06W23BCC1	36 06 36.1	91 36 12.6	1045	Cotter-Jefferson City	D
SHA002	03/10/03	18N07W01DCD1	36 14 23.2	91 40 47.2	-	-	D
SHA003	03/10/03	18N07W01CBB1	36 14 39.6	91 41 28.2	263	Cotter	D
SHA004	03/10/03	18N06W05DCA1	36 14 26.7	91 39 07.9	368	Cotter	D
SHA005	03/10/03	18N05W19BBA1	36 12 21.1	91 33 44.2	563	Cotter-Jefferson City	D
SHA006	03/10/03	19N05W11BDB1	36 18 59.0	91 29 09.3	1180	Roubidoux-Gunter	M
SHA008	03/10/03	19N05W22CBC1	36 17 01.0	91 30 36.2	368	Cotter-Jefferson City	C
SHA009	03/10/03	20N04W05ABA1	36 25 17.1	91 25 16.4	685	Roubidoux	D
SHA010	03/10/03	21N04W33ACC1	36 25 51.4	91 24 23.0	158	Cotter	D
SHA011	03/10/03	20N04W23BAA1	36 22 35.4	91 22 26.1	120	Cotter	D
SHA012	03/10/03	19N03W05DCC1	36 19 08.4	91 19 11.8	830	Roubidoux	D
SHA013	03/10/03	20N03W29ADB1	36 21 22.0	91 18 52.2	-	-	D
SHA014	03/10/03	19N04W26CCB1	36 15 45.1	91 22 59.3	188	Cotter	D
SHA016	03/17/03	18N04W28BBB1	36 11 15.5	91 25 22.4	208	Cotter	D
SHA056	03/10/03	-	36 19 15.8	91 29 02.0	1590	Roubidoux-Gunter	M
SHA098	03/17/03	-	36 15 45.7	91 23 45.4	S	Cotter	U
SHA099	03/10/03	-	-	-	S	Cotter	U

Table B-8: Hardy Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conduc -tivity	TDS	Alka-linity	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	7.46	454	242	249.9	305	<0.03	0.716	0.008	-	4.04	20	48.7	2.56	57.1	0.08	0.6	29.1	<0.05	1.42	-
FUL002	7.57	446	236	245.1	299	<0.03	0.251	<0.005	-	4.77	22.6	50	2.55	59	0.07	1.28	27.9	<0.05	1.63	-
FUL003	7.07	694	373	352.3	430	<0.03	4.08	0.009	-	4.38	32.8	75.4	15.6	81.1	0.07	0.88	44	<0.05	4.52	-
FUL004	7.13	721	375	356.8	435	<0.03	2.1	<0.005	-	3.4	36.4	77.1	30.5	87.1	0.06	1.07	45.8	<0.05	3.68	-
FUL005	7.2	705	385	361.8	441	<0.03	1.35	0.02	-	5.36	36	81	21	96.2	0.04	1.46	44.1	<0.05	5.26	-
FUL007	7.51	438	231	236.3	288	<0.03	2.07	0.009	-	2	24.8	48.6	2.75	58.2	0.03	0.7	27.7	<0.05	1.09	-
FUL010	6.95	778	431	449.2	548	<0.03	0.944	0.007	-	3.43	31.6	91.4	2.67	98.2	0.07	1.02	51.2	<0.05	0.73	-
FUL011	7.19	570	306	318.2	388	<0.03	1.26	0.008	-	2.56	23.4	68.3	2.02	73.1	0.05	0.82	36.5	<0.05	0.6	-
FUL099	7.28	545	286	285	348	<0.03	1.6	0.006	-	4.89	34	61.6	9.94	67.5	0.03	0.56	35.1	<0.05	1.65	-
SHA001	7.39	517	280	285.9	349	<0.03	0.418	0.012	-	3.98	24.3	69.8	5.37	65.2	0.08	1.33	32.5	<0.05	2.04	-
SHA002	7.37	525	282	288.4	352	<0.03	0.976	<0.005	-	5.87	17.4	58.6	2.9	65.3	0.07	1.26	33.8	<0.05	0.81	-
SHA003	7.45	456	245	238.8	291	<0.03	1.15	0.009	-	4.86	24.7	47.7	8.49	55.8	0.08	<0.46	28.9	<0.05	2.22	-
SHA004	7.39	510	276	289	353	<0.03	0.555	0.007	-	3.13	22.4	55.5	2.07	64.6	0.05	1.46	33.1	<0.05	1.04	-
SHA005	7.19	663	356	350.8	428	<0.03	1.37	0.007	-	4.57	27.7	77.1	14.1	82.6	0.07	1.33	41.9	<0.05	3	-
SHA006	7.15	660	355	371.8	454	<0.03	0.068	<0.005	-	10.2	35.7	74.5	1.93	85.7	0.04	1.56	44	<0.05	1.19	-
SHA008	7.48	546	287	255.9	312	<0.03	1.48	0.007	-	4.34	33.4	61.2	27.8	71.4	0.04	1.26	32.4	<0.05	5.37	-
SHA009	7.55	406	217	214.9	262	<0.03	0.743	<0.005	-	3.25	29.2	41.9	6.55	52	0.04	1.23	25.2	<0.05	1.41	-
SHA010	7.55	488	243	178.9	218	<0.03	2.44	0.008	-	3.46	25.5	41.4	33.6	53.6	0.05	<0.46	25	<0.05	7.6	-
SHA011	7.33	502	273	280.7	342	<0.03	0.304	<0.005	-	4.65	27.5	60.6	3.28	62	0.05	0.67	31.8	<0.05	1.61	-
SHA012	7.12	632	334	356.2	435	<0.03	0.33	<0.005	-	10.3	22.5	72.4	2.26	85.8	0.07	1.45	41.1	<0.05	0.98	-
SHA013	7.09	694	370	389.2	475	<0.03	0.62	<0.005	-	6.68	26.6	83.9	3.08	90.6	0.06	0.82	45.6	<0.05	0.8	-
SHA014	7.44	453	244	253	309	<0.03	0.212	0.006	-	4.32	18.4	48.2	2.31	56.2	0.03	<0.46	29.4	<0.05	1.14	-
SHA016	7.24	548	293	302.3	369	<0.03	0.425	0.006	-	8.07	24.6	63	2.46	106	0.11	1.47	35.9	<0.05	1.47	-
SHA056	7.11	660	353	370.2	452	<0.03	0.173	<0.005	-	9.12	33.7	73.8	2.24	91.3	0.05	1.65	44.7	<0.05	1.02	-
SHA098	7.41	532	282	296	361	<0.03	0.178	0.027	-	3.51	28.1	61.8	1.66	109	0.06	1.37	34.1	<0.05	1.57	-
SHA099	7.56	257	150	124.9	152	<0.03	0.647	0.008	-	5.59	28.5	24.4	6.18	44.3	0.04	0.91	15.3	<0.05	2.08	-
Min.	6.95	257	150	124.9	152.38	<0.03	0.068	<0.005	-	2.0	17.4	24.4	1.66	44.3	0.03	<0.46	15.3	<0.05	0.6	-
Max.	7.57	778	431	449.2	548.02	<0.03	4.08	0.027	-	10.3	36.4	91.4	33.6	109	0.11	1.65	51.2	<0.05	7.6	-
Mean	7.31	553.85	296.35	296.21	361.38	<0.03	1.02	0.01	-	5.03	27.38	62.23	8.30	73.80	0.06	1.03	35.23	<0.05	2.15	-

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	Conduc-tivity	TDS	Alka-linity	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	06/19/01	03N08W30DDD1	34 50 58.8	91 53 40.2	160	Alluvial	C
LON009A	06/19/01	-	34 49 55.0	91 56 41.0	~150	Alluvial	I
LON010	06/12/01	02N08W06ADA1	34 49 46.1	91 53 40.4	128	Alluvial	D
LON014	06/12/01	02N08W20BCD1	34 47 10.1	91 53 29.7	164	Alluvial	M
LON016	06/19/01	02N09W28CCC1	34 45 49.1	91 59 09.7	136	Alluvial	I
LON017	06/12/01	02N08W32BCC1	34 45 32.5	91 52 43.5	195	Alluvial	I
LON017R	06/12/01	02N08W32	34 45 18.2	91 53 46.4	~250	Alluvial	I
LON020	06/12/01	01N09W13BCB1	34 42 40.2	91 56 01.7	125	Alluvial	I
LON021	06/19/01	01N09W21BAB1	34 42 19.2	91 59 21.2	100	Alluvial	I
LON022	06/12/01	02N09W34AAA1	34 45 44.3	91 57 07.6	354	Sparta	C/I
LON024	06/12/01	01N08W16BAC1	34 42 56.4	91 52 32.4	~150	Alluvial	I
LON040	06/19/01	-	34 41 13.5	91 58 37.0	-	Alluvial?	C
LON041	06/19/01	-	34 41 14.8	91 58 58.1	-	-	C
LON042	06/19/01	-	34 42 19.7	91 58 02.1	-	-	I

Table B-12: Lonoke Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conduc -tivity	TDS	Alka- linity	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	6.66	208	130	61	74.42	0.043	0.035	-	0.3	5.66	112.9	12.3	7.93	4370	0.15	1.81	3.62	1211	11.2	41.8
LON009A	6.87	246	171	87.5	106.75	0.058	0.029	-	0.22	12.1	184	24.34	15.8	2200	0.16	1.76	7.25	421.7	13.4	35.4
LON010	6.72	295	189.5	113.5	138.47	0.083	0.024	0.011	0.24	6.32	179.5	29	19.58	4930	0.14	0.7	7.8	1038	15.8	35
LON014	7.14	366	222	141.5	172.63	0.116	0.03	<0.005	0.21	10	211.4	38.8	23.76	3120	0.18	0.9	11.3	446.4	19	32.9
LON016	7.22	805	540	297.5	362.95	0.522	0.031	-	0.48	131	527.1	130.1	18.3	18600	0.16	1.92	21.7	536.1	16.9	24.9
LON017	6.81	621	374.5	258.5	315.37	0.194	0.027	0.006	0.15	39.97	347.5	86.2	20.44	3620	0.16	1.3	18.4	679.9	16.3	29
LON017R	6.86	553	331.5	237.5	289.75	0.07	0.029	<0.005	0.2	40.74	317.8	73.1	7.72	2810	0.17	1.8	17.4	245.2	15.7	27.7
LON020	6.84	959	651.5	261.5	319.03	0.364	0.025	0.011	0.51	192.72	147.4	150.3	12.96	23600	0.12	1.6	24.8	951.9	14.8	29.6
LON021	7.58	664	423	299.5	365.39	0.364	0.029	-	0.72	50.6	543.8	107.6	18.4	7450	0.17	1.63	16.6	438.5	21.6	22.6
LON022	6.91	381	210	186	226.92	0.157	0.028	0.005	0.17	1.78	327.7	40	6.55	4240	0.14	1.9	10.6	254.5	22.4	14.8
LON024	6.91	672	396.5	294.5	359.29	0.419	0.029	<0.005	0.17	28.95	473.5	88.7	22.53	2140	0.16	1.7	17	423.3	29.7	26
LON040	7.18	823	486	282	344.04	0.992	0.033	-	0.59	65.4	633.9	95.38	60.6	24000	0.24	1.95	21.4	667.9	46.7	21.5
LON041	7.16	604	327	224	273.28	0.859	0.031	-	0.62	23.7	886.3	66.66	32.6	28400	0.2	1.64	16.4	396.7	24.1	21.7
LON042	7.52	913	676	398	485.56	0.315	0.038	-	0.38	140	799.7	174.1	19.4	12500	0.12	1.69	22.7	930.2	13.1	28.5
Min.	6.66	208	130	61	74.42	0.043	0.024	<0.005	0.15	1.78	112.9	12.3	6.55	2140	0.12	0.7	3.62	245.2	11.2	14.8
Max.	7.58	959	676	398	485.56	0.992	0.038	0.011	0.72	192.72	886.3	174.1	60.6	28400	0.24	1.95	24.8	1211	46.7	41.8
Mean	7.03	579.29	366.32	224.46	273.85	0.33	0.03	0.01	0.35	53.50	406.61	79.76	20.47	10141.43	0.16	1.59	15.50	617.24	20.05	27.96

Table B-13: Omaha Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
BNE002	12/16/02	19N21W14CDA1	36 17 53.1	93 11 05.9	NA	SP	U
BNE003	12/16/02	19N22W12CAB1	36 19 00.6	93 16 24.7	NA	SP	D
BNE005A	12/17/02	19N21W05DDA3	36 19 36.2	93 13 40.1	NA	SP	D
BNE007	12/17/02	19N21W31ACB1	36 23 02.0	93 12 29.0	NA	SP	D
BNE008A	12/17/02	20N20W02DBB2	36 25 01.1	93 10 37.3	NA	SP	D
BNE012	12/17/02	21N20W29ACD1	36 26 47.0	93 07 31.0	NA	SP	D
BNE015	12/17/02	21N21W17CCB1	36 28 19.0	93 14 24.0	NA	SP	U
BNE017	12/16/02	21N21W09BAD1	36 29 45.0	93 12 46.0	NA	SP	D
BNE023	12/16/02	20N21W33ACA1	36 22 31.0	93 14 29.5	565'	O	D
BNE024	12/16/02	20N22W13CBD1	36 23 20.6	93 16 24.4	460'	O	D
BNE025	12/17/02	20N21W15CAD1	36 23 18.0	93 11 52.0	455'	O	D
BNE028	12/16/02	20N22W03DDA1	36 25 01.0	93 17 50.9	400'	O	D
BNE029	12/17/02	21N21W26ADA1	36 26 54.0	93 10 10.0	675'	O	D
BNE030	12/17/02	21N20W23CDD1	36 27 05.0	93 04 36.0	755'	O	D
BNE032	12/16/02	21N21W15BDA1	36 28 43.2	93 11 49.2	705'	O	D
BNE033	12/16/02	21N22W12DCC1	36 29 10.0	93 16 00.0	550'	O	D
BNE036	12/17/02	21N21W22DDA1	36 27 24.0	93 11 19.4	1340'	O	P
BNE037	12/16/02	19N21W20BDC1	36 17 22.2	93 14 14.8	450'	O	D
BNE039	01/21/03	20N20W20ABC1	36 22 36.0	93 07 38.0	~300'	O	D
BNE040	12/16/02	20N21W31ABC1	36 21 05.0	93 14 58.0	~160'	SP	D
BNE042	12/17/02	20N20W09AAA1	36 24 22.0	93 06 18.0	NA	O	U
BNE044	12/16/02	21N21W09ABB1	36 29 51.1	93 12 42.4	NA	SP	D
BNE045	12/17/02	21N21W18DAD1	36 28 30.2	93 14 23.1	~550'	O	D
BNE046	12/17/02	20N19W23CDC3	36 27 06.7	93 04 43.8	248'	O	D
BNE047	12/17/02	20N20W02DBA3	36 25 00.2	93 10 33.3	375	O	D
BNE048	12/17/02	20N19W10BCA2	36 24 09.5	93 05 55.8	~465'	O	D
BNE050	01/21/03	19N20W20BCC2	36 22 26.7	93 08 06.6	550'	O	D

Table B-14: Omaha Monitoring Area Selected Descriptive Statistics: Springfield Plateau Aquifer

Sample ID	pH	Conduc -tivity	TDS	Alka-linity	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	7.52	442	252	194	237	<0.03	2.25	0.026	-	13.7	39.1	81.9	16.9	<15.0	0.1	1.42	2.05	1.18	6.27	9.8
BNE003	7.35	514	299	246	300	<0.03	2.69	0.024	-	11.1	59.6	100	10.8	<15.0	0.11	1.84	2.12	0.63	4.17	11.5
BNE005A	7.31	466	262	230	280	<0.03	1.83	0.031	-	6.57	44.8	94.9	10.4	17.1	0.1	1.63	2.41	2.64	3.53	11.8
BNE007	7.47	412	249	162	198	<0.03	5.03	0.001	-	7	40.8	75.2	19.7	<15.0	0.08	0.96	1.65	1.14	7.06	10.9
BNE008A	8.25	283	172	96	117	<0.03	5.14	0.067	-	11.4	44.8	42.8	10.4	<15.0	0.11	7.8	3.34	9.71	4.94	9.8
BNE012	8.16	281	180	93	113	<0.03	9.4	0.022	-	9.41	28.5	47.3	4.71	<15.0	0.09	1.63	2.48	0.6	2.59	11.3
BNE015	8.51	403	247	136	166	<0.03	10.2	0.036	-	6.17	43.7	70.3	17	15.2	0.12	2.12	4.05	0.92	5.66	11.5
BNE017	8.17	293	167	84	102	<0.03	3.31	0.025	-	5.31	64.5	38.1	29.8	15.6	0.1	1.47	3.22	0.61	12.3	9
BNE044	8.29	320	189	57	70	<0.03	3.16	0.027	-	8.33	69.1	29.7	47	19.4	0.13	1.45	4.53	0.74	22	7.4
Min.	7.31	281	167	57	69.54	<0.03	1.83	0.001	-	5.31	28.5	29.7	4.71	<15	0.08	0.96	1.65	0.6	2.59	7.4
Max.	8.51	514	299	245.7	299.75	<0.03	10.2	0.067	-	13.7	69.1	100	47	19.4	0.13	7.8	4.53	9.71	22	11.8
Mean	7.89	379.33	224.11	144.11	175.82	<0.03	4.78	0.03	-	8.78	48.32	64.47	18.52	11.6	0.10	2.26	2.87	2.02	7.61	10.33

Table B-15: Omaha Monitoring Area Selected Descriptive Statistics: Ozark Aquifer

Sample ID	pH	Conduc -tivity	TDS	Alka-linity	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	7.94	351	183	174	212	<0.03	0.01	0.007	-	18.6	10.2	43.5	4.72	56.5	0.28	0.91	16.9	1.44	2.16	9.3
BNE024	7.68	489	256	255	311	<0.03	0.134	0.007	-	18.6	11.1	52.8	3.74	79.3	0.62	3.45	27.7	0.9	6.18	8.7
BNE025	7.5	546	295	248	302	<0.03	0.892	0.009	-	48.1	15.7	69	8.71	89.3	0.14	1.07	30	0.8	2.58	10.3
BNE028	7.83	403	216	205	250	<0.03	1.11	0.008	-	15.6	<8.80	50.2	3.75	72.6	0.93	3.37	18.8	4.3	5.48	9
BNE029	7.49	624	347	301	367	<0.03	1.33	0.011	-	44.4	34.3	92.3	5.49	85	0.21	2.71	27.5	1.19	1.91	10
BNE030	7.47	577	304	301	367	<0.03	0.94	0.011	-	23.6	10.2	66.4	3.37	103	0.33	3.05	37.5	0.65	1.91	9.5
BNE032	8.04	345	191	152	185	<0.03	0.019	0.008	-	41.4	10.7	38.3	1.31	70.6	0.38	1.68	19.4	2.54	0.62	8.5
BNE033	7.89	337	175	177	216	<0.03	0.136	<0.005	-	12.9	<8.80	39.1	2.02	64.3	0.14	0.62	19.9	<0.50	1.18	10.3
BNE036	7.86	350	175	188	229	<0.03	<0.01	0.01	-	14.2	<8.80	41.5	2.75	59.7	0.19	0.82	18.7	0.62	2.26	9.5
BNE037	7.53	564	310	264	322	<0.03	1.13	0.01	-	33.9	23.8	82.5	9.24	61.5	0.58	<0.46	18.3	0.74	15.2	9.7
BNE039	7.19	549	313	295	360	<0.03	0.087	0.018	-	27.8	38.4	81.8	1.78	39.5	0.13	1.81	20.9	0.57	1.07	10.6
BNE042	7.48	689	365	383	468	<0.03	2.28	0.011	-	5.79	35.3	82.3	7.22	127	0.11	<0.46	45.9	<0.50	1.64	12.8
BNE045	7.97	333	177	170	208	<0.03	0.764	0.012	-	14.2	9.88	43.7	2.12	54.9	0.13	0.76	16.6	0.69	1.67	-
BNE046	7.43	561	293	305	372	<0.03	0.053	0.011	-	18.3	<8.80	66.9	1.93	98.4	0.43	3.65	34.2	<0.50	1.06	9.2
BNE047	7.16	774	460	316	386	<0.03	0.101	0.008	-	120	25	97.1	2.45	133	0.47	5.68	44.3	1.72	2.27	9.1
BNE048	7.19	595	311	307	375	<0.03	1.42	0.008	-	10.9	25.6	68.6	12.5	102	0.12	1.03	38.4	<0.50	3.43	8.6
BNE050	7.24	540	300	291	355	<0.03	0.1	0.018	-	26.8	18.2	67.9	1.73	64.9	0.07	1.49	30.5	<0.50	1.17	10.8
Min.	7.16	333	175	151.80	185.20	<0.03	<0.01	<0.005	-	5.79	<8.80	38.30	1.31	39.50	0.07	<0.46	16.60	<0.50	0.62	8.50
Max.	8.04	774	460	383.20	467.50	<0.03	2.280	0.0180	-	120.00	38.40	97.10	12.50	133.00	0.93	5.68	45.90	4.30	15.20	12.80
Mean	7.58	507.47	274.76	254.87	310.94	<0.03	0.657	0.0104	-	29.12	16.82	63.76	4.40	80.09	0.31	1.92	27.38	1.02	3.05	9.74

Table B-16: Ouachita 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-17: Ouachita Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conduc -tivity	TDS	Alka-linity	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	0.02	0.02	0.01	-	2.29	4.40	0.36	1.90	7.50	0.06	0.65	0.07	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-18: Pine Bluff Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
JEF001	05/01/01	-	-	-	-	Sparta?	C
JEF003	05/01/01	05S09W19BAA1	34 16 08.0	92 01 29.0	1275	Sparta	C/I
JEF004	05/01/01	05S09W30DBA1	34 15 06.0	92 01 29.0	792	Sparta	C
JEF005	05/01/01	-	-	-	-	Sparta	M
JEF007	05/01/01	-	-	-	-	Sparta	C
JEF008	05/01/01	05S10W11ACA1	34 17 40.0	92 03 24.0	992	Sparta	C
JEF010	05/01/01	06S09W04BAB1	34 13 30.5	92 01 06.0	865	Sparta	M
JEF012	05/01/01	06S09W17CCC1	34 11 49.0	92 02 29.0	848	Sparta	M
JEF016	05/01/01	05S09W07CCC1	34 17 05.0	92 01 58.0	265	Cockfield	D
JEF024	04/26/01	05S08W30AAB1	34 15 07.5	91 54 46.0	~900	Sparta	C/I
JEF028	05/01/01	-	-	-	-	Alluvial	I
JEF034	05/01/01	05S09W34CAB1	34 13 54.0	91 58 25.0	102	Alluvial	C/I
JEF038	04/26/01	06S08W09ACC1	34 13 05.0	91 54 38.0	165	Alluvial	C/I
JEF039	04/26/01	06S08W10CAA1	34 12 59.0	91 53 44.0	1020	Sparta	C/I
JEF041	05/01/01	-	-	-	-	Sparta	M
JEF042	05/01/01	-	-	-	-	Cockfield	D
JEF043	05/23/01	-	-	-	-	Cockfield	I
JEF044	05/23/01	-	-	-	~76	Alluvial	C
JEF045	05/23/01	-	-	-	772	Sparta	C
JEF046	05/23/01	-	-	-	-	Sparta	C

Table B-19: Pine Bluff Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conduc -tivity	TDS	Alka-linity	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
JEF001	6.65	562	123	54.3	66.246	0.28	<0.010	0.01	0.06	27.85	124.7	7.5	3.82	2550	0.13	4.6	1.8	69.9	26.1	14.3
JEF003	6.46	113	79.5	46.2	56.364	0.18	<0.010	0.01	0.098	4.21	128.3	4.7	2.97	2620	0.14	5.6	1.3	51	14.5	15.5
JEF004	6.42	146.3	83	48.3	58.926	0.23	<0.010	0.01	0.084	3.56	106.2	3.9	2.8	4130	0.12	5.8	1.1	61.4	15.8	16.1
JEF005	6.67	118	77	47.5	57.95	0.18	<0.010	<0.005	0.114	3.13	116.4	6.3	2.44	2980	0.12	6.5	1.6	66.2	11.4	16.7
JEF007	6.75	122.3	75	43.9	53.558	0.13	<0.010	<0.005	0.087	3.57	117.8	7.5	2.79	2570	0.12	5.5	1.8	55.2	8.5	14.6
JEF008	6.72	130.4	82	49.5	60.39	0.18	<0.010	0.01	0.101	3.52	121.3	6	2.42	2740	0.14	6.1	1.6	63.5	12.6	14.4
JEF010	6.71	148	86	53.3	65.026	0.17	<0.010	0.01	0.119	3.56	135.1	7	2.21	2440	0.15	6.5	1.7	66	13.5	16.5
JEF012	6.8	145	99.5	63.9	77.958	0.21	<0.010	0.01	0.123	3.09	86.1	8.3	1.87	1590	0.15	6.6	1.6	74	16	18.1
JEF016	6.39	484	312	183.5	223.87	0.46	<0.010	0.06	0.246	24.83	61.4	20.1	19.66	2080	0.13	5.6	5.7	319.9	74.8	44.2
JEF024	6.78	177	112	62.3	76.006	0.23	<0.010	0.01	0.132	8.63	119.5	6.6	2.31	2420	-	7.2	1.6	59	22.2	17.4
JEF028	6.76	839	459	338	412.36	1.06	<0.010	0.02	0.704	21.71	340.4	97.1	30.19	10900	0.27	2.7	26.2	367	47.1	28.4
JEF034	6.71	399	352	258.8	315.736	0.58	<0.010	0.02	0.831	17.28	398.1	81.6	23.19	12600	0.21	1.5	21.3	262	15.3	31.4
JEF038	6.51	1625	802	530	646.6	0.7	<0.010	0.01	1.121	21.5	600.3	158.3	130.8	18400	-	4.9	28.3	1215	119	28.6
JEF039	6.6	224	116	65.6	80.032	0.23	<0.010	0.01	0.144	5.47	83.5	6.6	1.82	1610	-	8.2	1.4	50.9	23.3	16.5
JEF041	6.28	101.5	68	40	48.8	0.11	<0.010	0.03	0.07	3.09	129.5	5.3	2.53	2540	0.11	4.3	1.4	51.3	8.1	15.5
JEF042	7.48	480	343	144.8	176.656	0.68	<0.010	0.33	0.328	86.21	16.4	4.4	8.01	328	0.1	4.2	1	39.6	105	39.9
JEF043	8.61	678	401.5	197.7	241.194	1.237	0.032	0.057	-	68.98	66.3	15	37.2	16.7	0.5	6.1	2.6	27.2	127	10.7
JEF044	6.33	833	348	183.4	223.748	0.39	0.019	0.046	-	20.49	289	27.8	28.87	43500	0.08	3.1	12.9	2670	43.8	32.4
JEF045	6.36	129	83	47.61	58.0842	0.209	0.033	0.053	-	3.4	129	4.4	2.64	3680	0.11	6.1	1.3	65.2	13.4	16
JEF046	6.32	116	84	46.82	57.1204	0.183	0.019	0.053	-	3.41	135	5.2	2.59	3440	0.12	6.2	1.4	67.1	12.2	15.7
Min.	6.28	101.5	68	40	48.8	0.11	<0.010	<0.005	0.038	3.09	16.4	3.9	1.82	16.7	0.08	1.5	1	27.2	8.1	10.7
Max.	8.61	1625	802	530	646.6	1.237	0.033	0.33	1.121	86.21	600.3	158.3	130.8	43500	0.5	8.2	28.3	2670	127	44.2
Mean	6.72	378.53	209.28	125.27	152.83	0.38	0.01	0.04	0.27	16.87	165.22	24.18	15.56	6156.74	0.16	5.37	5.88	285.07	36.48	21.15

Table B-20: 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-21: Athens Piedmont Plateau/Gulf Coastal Plain Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conduc -tivity	TDS	Alka-linity	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	0.015	0.011	0.006	-	1.95	4.40	0.14	1.99	7.5	0.08	0.23	0.07	0.25	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

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484 Pages

State of Arkansas
Department of Environmental Quality

"To protect, enhance and restore the natural environment for the well-being of all Arkansans."