Arkansas Department of Environmental Quality
Water Division

2012 Integrated Water Quality Monitoring and Assessment Report

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

"To Protect, Enhance, and Restore
the
Natural Environment
for the
Well-being of all Arkansans."

This report is maintained by:
Arkansas Department of Environmental Quality
Water Division

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

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STATE OF ARKANSAS

DEPARTMENT
OF
ENVIRONMENTAL QUALITY

INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT 2012

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

WQ04-12-01

350 Pages

WATER DIVISION PLANNING BRANCH

The Planning Branch consists of biologists, ecologists, and geologists that manage activities related to both surface and ground water. Among the activities is the management of the State Water Quality Monitoring Networks for both surface and subsurface waters; routine monitoring activities; and intensive, special investigations of the physical, chemical, and biological characteristics of watersheds and/or aquifers. The data generated from these activities, as well as other readily available data, are used to prepare the biennial "Integrated Water Quality Monitoring and Assessment Report (305(b))," the "List of Impaired Waterbodies, (303(d) list)," and develop Total Maximum Daily Loads (TMDLs). The data may also be used to develop water quality standards and criteria for the evaluation of designated use attainment and to prioritize restoration and remediation activities.

The staff continues to develop and/or enhance ecoregion-based, biological assessment criteria; is active in the development and updating of water quality standards; technical review and administration of the National Pollutant Discharge Elimination System Permits Whole Effluent Toxicity Testing Program; and represent the Department on numerous federal, state, local, and watershed-based advisory boards and technical support group. The Education and Outreach Section is responsible for the development and implementation of outreach and educational materials and programs. They coordinate and implement the activities of the Arkansas Watershed Advisory Group; a group of federal, state, local, and private citizens working together to assist watershed groups in protecting and enhancing the natural environment in Arkansas. The Groundwater Section is currently engaged in implementing an EPA Exchange Network program grant to enable the flow of ADEQ's ambient groundwater quality data to EPA's WQX and to develop a web-based mapping and retrieval application for the data. Groundwater sampling is being conducted in the area of the Fayetteville Shale gas play and new groundwater monitoring area are being developed which target springs in northwest Arkansas. The Groundwater Section also oversees portions of the Groundwater Protection Program that are delegated to the Arkansas Department of Health (Wellhead Protection Program) and the Arkansas Natural Resources Commission (Groundwater Protection and Management Program).

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To learn more about the Water Division and other divisions of the Arkansas Department of Environmental Quality, and to view a list of publications by the Planning Branch, visit www.adeq.state.ar.us or call at (501) 682-0744.

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Appreciation is given to all those individuals, agencies, and groups that sent in information and/or data for the development of this report.

In addition, appreciation is given to all of those individuals in the Computer Services Division, Mining Division, Environmental Preservation & Technical Services Division, Hazardous Waste Division, Regulated Storage Tanks Division, and the Water Division of the Arkansas Department of Environmental Quality. Special thanks and recognition goes to Marysia Jastrzebski for the cover photo of the Buffalo River watershed.

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PART I EXECUTIVE SUMMARY/OVERVIEW

Section 305(b) of the Clean Water Act requires states to perform a comprehensive assessment of the states water quality which is to be reported to Congress every two years. In addition, Section 303(d) of the Clean Water Act requires states to prepare a list of impaired waters on which Total Maximum Daily Loads or other corrective actions must be implemented. Current U.S. Environmental Protection Agency (EPA) guidance recommends producing an integrated report combining requirements of the Clean Water Act for Sections 305(b) reporting and 303(d) submissions. The combined report is the *Integrated Water Quality Monitoring and Assessment Report.* This report is prepared using the "Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b), and 314 of the Clean Water Act; TMDL-01-03" and supplements.

Specific guidance developed by EPA is used by all states to aid in making water quality standards attainment 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 is necessary to modify criteria to account for data type, quality, quantity, and data quality objectives; ecological variations; and water quality standards variations.

The Arkansas Department of Environmental Quality's (Department) water quality monitoring networks database is the primary database used for this assessment in Arkansas. In addition, water quality and biological data collected by Department staff, other state and federal agencies, watershed groups, private consultants, and universities are also used. These types of data have become more abundant and of better quality in recent years and has aided the Department significantly.

Numerous toxicity tests were completed and reviewed during this period of record including self monitoring tests by dischargers and compliance testing by the Department. The bacteria monitoring program was continued at selected regular monitoring stations which were sampled seasonally for *Escherichia coli* (*E. coli*) bacteria.

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

The number of evaluated waterbodies meeting all of the assessed designated uses and water quality standards remains similar to previous years. Exact estimates and percentages cannot be extrapolated to all waters of the State for the following reasons: (a) if any of the designated uses or assigned water quality standards of a waterbody are not met, the waterbody is listed as "not attaining water quality standards" even though other designated uses and/or water quality standards 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 results toward the impaired use category; (c) much of the data from the Delta Region of the State were 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, Section 401 (water quality certification) is utilized to review all federal licenses or permits, including but not limited to Section 404, which may result in any discharge of dredged or fill materials into 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.

Groundwater assessment activities by the Department have expanded significantly in the late 1990s and early 2000s. Arkansas's Ambient Groundwater Quality Monitoring Program currently maintains over 300 monitoring sites across the State; which are sampled approximately every three years on a rotating basis. The monitoring network has recently been expanded from eleven to twelve distinct areas. The Department added the North Central Arkansas ambient groundwater monitoring area in the Fayetteville Shale gas play in Conway, Cleburne, Faulkner, Van Buren, and White counties. Wells in this area are primarily completed in the Pennsylvanian Atoka Formation which overlies the Fayetteville Shale. The North Central monitoring area was developed in response to the rapid increase of gas well drilling in recent years. In addition to well sampling, the Department closely monitors groundwater issues, current technology, environmental studies and legislation associated with shale gas drilling in Arkansas and in other areas of the country where unconventional gas reserves are being developed. The Groundwater Section is also in the process of developing a groundwater monitoring area in northwestern Arkansas with emphasis on springs, to provide background data and assess possible anthropogenic impacts on groundwater quality due to rapid commercial and residential development in this area. Finally, in addition to the established ambient monitoring sites, the Department has completed several special groundwater investigations in recent years focused on particular concerns such as pesticide use in the Delta, effects of confined animal operations in northwest Arkansas, areas of saltwater intrusion in southeast Arkansas, occurrence of arsenic exceeding federal maximum contaminant levels in eastern Arkansas, and the interaction of surface and groundwater in the Arkansas River alluvium near Dardanelle, Arkansas.

The increasing focus on groundwater quality in recent years directly reflects the increased attention given to nonpoint sources of contamination. Toward that end, other state and federal agencies are involved in groundwater case studies, including agencies which in past years had little involvement in groundwater quality concerns, such as the University of Arkansas Cooperative Extension Service and the Natural Resources Conservation Service. In addition to water quality concerns, declining groundwater levels prompted the Arkansas State Legislature to enact legislation in 1991 to address the overuse of groundwater. The present report on groundwater assessment activities generally follows the 1996 EPA guidance, which enacted many changes intended to provide consistency among States' reports.

Groundwater accounts for approximately 60 percent of the total water use in Arkansas, and provides high-quality water for industrial, agricultural, municipal, and domestic uses. Groundwater also provides numerous other benefits including contribution to base flow in streams and recreational use of hot springs. Both nonpoint and point sources of contamination have been documented throughout Arkansas, and monitoring and remediation of these sources, in addition to contamination prevention activities, are among the tasks of the Department's various groundwater protection programs.

Arkansas's point source discharge controls are managed through the National Pollutant Discharge Elimination System (NPDES) program which was delegated to the State by EPA. 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 indicate 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 waste management activities of 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 groundwater and surface water monitoring and applied research on the fate of animal waste applied to pastures are attempting to address nonpoint source impacts from confined animal activities. Expansion of the nonpoint source management program began in 1998 and now includes management plans for resource extraction, silviculture, agriculture, surface erosion, household, and small business. Storm water pollution prevention plans have been developed to reduce the impacts of construction activities in rapid growth areas in larger metropolitan areas of the State. Because of recent assessments of impaired waters in row-crop dominated Delta areas of the State and completion of Total Maximum Daily Loads (TMDLs), implementation of watershed management plans are expanding into row-crop agriculture. Through the formation of watershed groups and education outreach programs, implementation of watershed restoration activities has begun to address many of these issues.

Classification of the State's waters by ecoregion not only categorizes them by physical, chemical and biological features, but separates major pollution problems, most of which are land use related.

Water quality in the Delta Ecoregion is significantly influenced by nonpoint source runoff from its highly agriculturalized areas. The vast majority of 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 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 Clean Water Act is being met, even though the aquatic life communities have been substantially altered.

The Gulf Coastal Ecoregion 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 other resources. Impacts occur from the extraction, storage, transport, and processing of resources. Although timber is the major resource harvested in this area, no large scale impairments from timber harvest activities have been identified in this area.

The Ouachita Mountain Ecoregion 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 are 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 have not indicated significant impairments to the streams within this region. Occasional above normal turbidity values have been observed during periods of significant rainfall. 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 Ecoregion 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 uses, which are primarily pasture lands with increasing poultry production. Fecal coliform bacteria have been a parameter of concern due to its preclusion of the swimmable use. Measurements during storm events routinely exceeded the water quality standard, although the source usually was not fecal contamination. The use of *E. coli* as the indicator organism provided a more accurate measurement of contamination from warm-blooded animals and has indicated no significant problems. The current exploitation of natural gas deposits has resulted in some site specific water quality degradation. This area experienced a rapid expansion of confined animal activities throughout the 1990s. Soil types in much of this area are highly erosive and tend to easily go into colloidal suspension, thus causing long-lasting, high turbidity values.

The Boston Mountains Ecoregion, 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 (ERWs). 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 continue 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 Ecoregion, located in extreme northern 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 ERWs. The fractured limestone and dolomite lithology of the region allows a direct linkage from surface waters to groundwater. 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. Removal of gravel from the banks and beds of streams is a frequent activity. This causes direct habitat degradation and greatly accelerates siltation problems within the streams.

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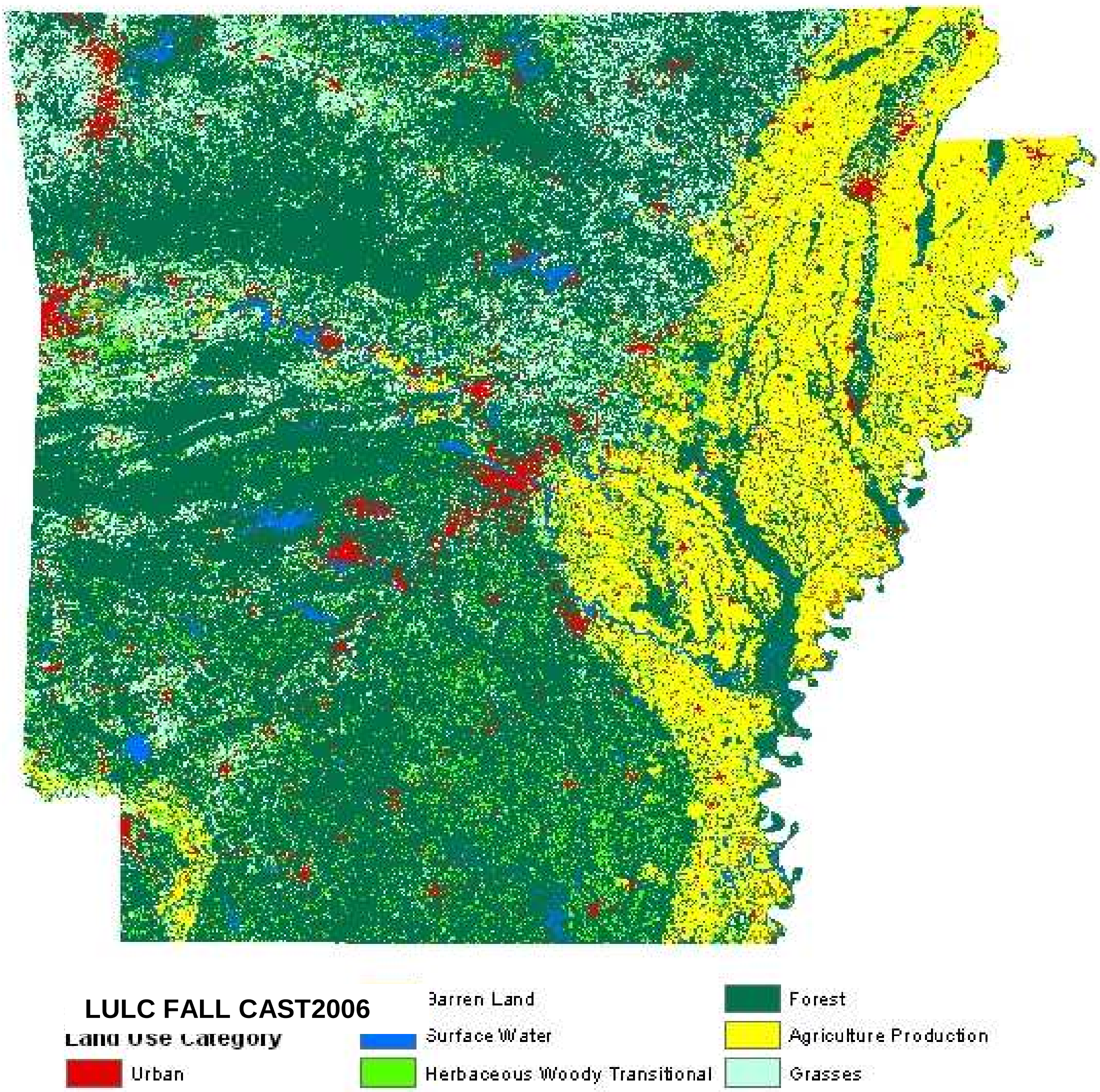
PART II	BACKGROUND
Chapter One	ATLAS OF ARKANSAS

There are approximately 34 million acres of land and surface water inside Arkansas's boundaries. Of this total, approximately 14 million acres are in agriculture production: approximately 9 million acres in crop production and approximately 3 million acres in pasture land and other agricultural uses. There are approximately 18 million acres of forests in the State. However, not all of this acreage is managed for timber production. There are approximately one-half million acres of surface waters in the State. There are approximately 1 million acres in urban areas. The remaining acreage is in herbaceous/woody/transitional land, barren land, state parks, wildlife areas, highways, roads, and other non-agricultural lands. Figure II-1 is a depiction of the overall land use in the State.

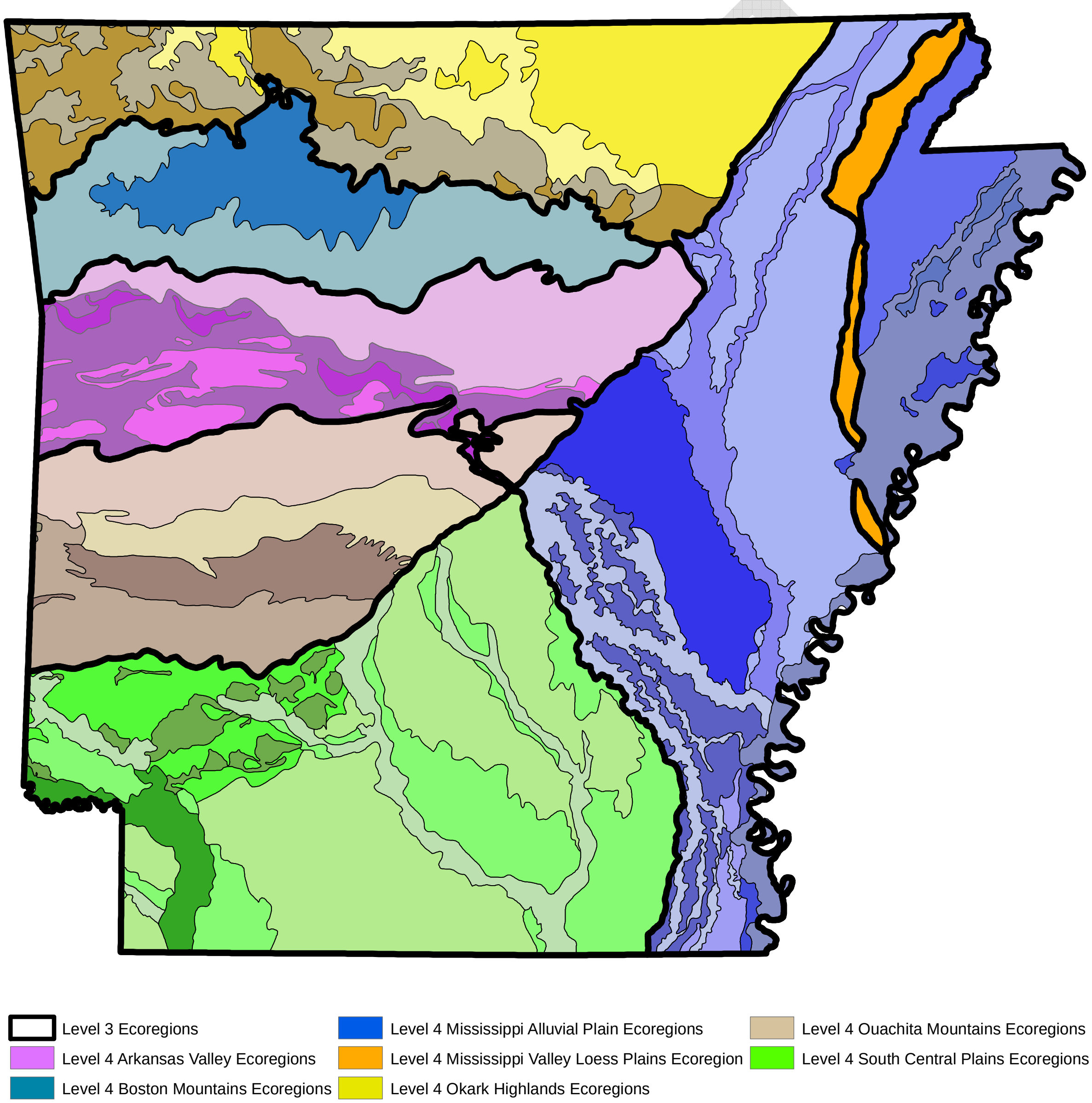
Figure II-1: Land Use



Ecoregions

The original ecoregion survey completed in 1987 (ADPCE, 1987) identified six distinct ecoregions (Level Three Ecoregions) in the State. Since that time there has been continued discussion concerning the boundaries of the ecoregions and if Crowley's Ridge, located in eastern Arkansas, should be identified as a separate ecoregion. In the late 1990s and early 2000s, a diverse group of scientists convened to better define the Level Three Ecoregion boundaries and subdivide them into smaller sections, Level Four Ecoregions. Woods, et al. (2004), identified seven Level Three Ecoregions and 32 Level Four Ecoregions in the State of Arkansas (Figure II-2).

Figure II-2: Arkansas's Ecoregions



River Basins/Total River Miles

The State is divided by six major river basins: Red River, Ouachita River, Arkansas River, White River, St. Francis River, and the Mississippi River. Arkansas has 13,490 miles of rivers and streams digitized in the ADEQ Water Base Layer. The ADEQ Water Base Layer was created from the Medium Resolution (1:100,000-scale) National Hydrography Dataset (NHD). The Medium Resolution NHD includes the 2nd, 3rd, 4th and 5th order streams. The National Hydrography Dataset combines elements of the Digital Line Graph (DLG) and EPA River Reach File (RF3): spatial accuracy and comprehensiveness from the DLG and network relationships, names, and a unique identifier (reach code) for surface water features from RF3. The NHD supersedes DLG and RF3 by incorporating them, not by replacing them. The Department continues to primarily use the Medium Resolution NHD for management and planning activities, but supplements the database primarily by utilizing the High Resolution NHD. The High Resolution NHD includes the 1st order streams, or the intermittent streams and ephemeral drainages that flow only during a rainfall event.

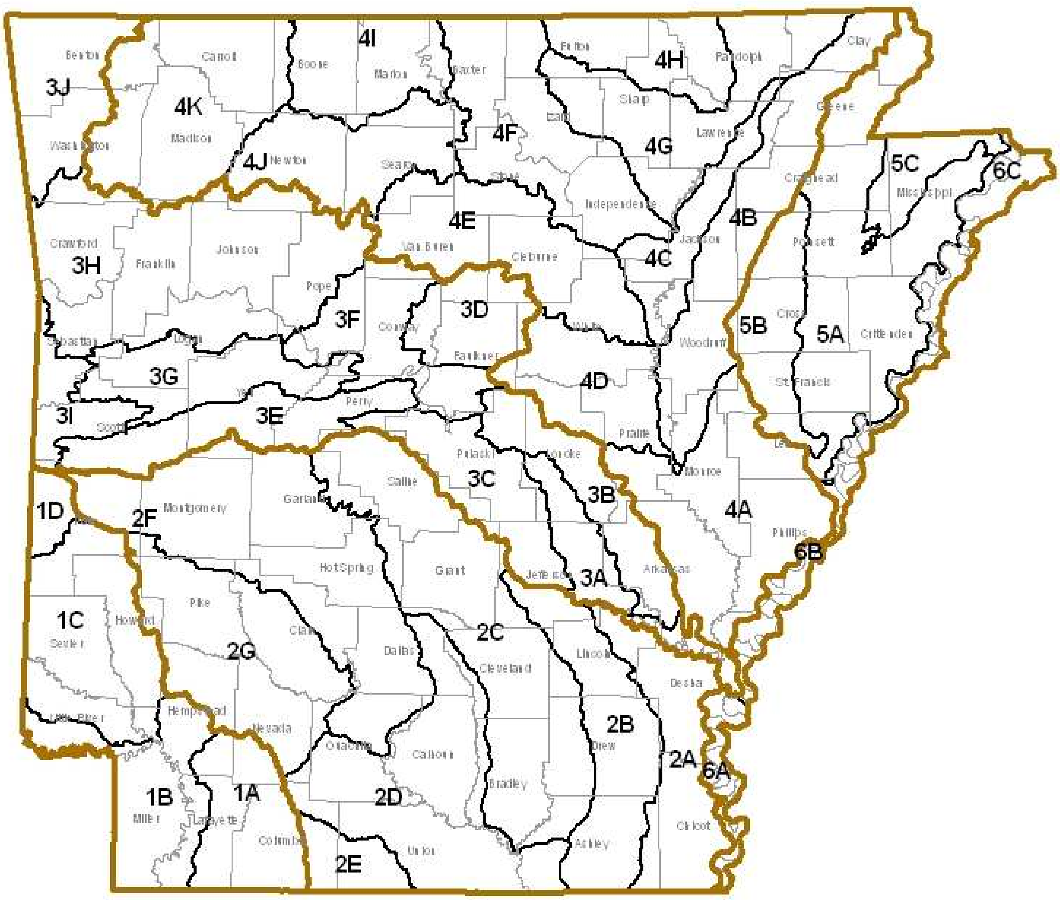
Total river and stream miles	87,617.5
Perennial stream miles	28,408.2
Intermittent stream miles	53,465.2
Ditches and canal miles	5,250.6
Border stream miles	493.5
Total acres of lakes, reservoirs, and ponds	515,635.0

The six river basins are subdivided into 38 water quality planning segments (Figure II-3) based on hydrological characteristics, human activities, geographic characteristics, and other factors. The planning segments are further broken down into almost 1,600 smaller watersheds, based on discrete hydrological boundaries as defined by the U.S. Geological Survey (USGS) 12-digit hydrologic unit codes (HUCs).

Publicly Owned Lakes/Reservoirs

A discussion of lakes and reservoirs is included in Part III, Chapter Five and includes a list of Arkansas's significant publicly owned lakes and reservoirs and their trophic status. The State has a total of 357,896 acres of significant publicly-owned lakes. The EPA RF3/DLG calculation identifies a total of 515,635 acres of lakes, ponds and other impounded waters in the State some of which are private fish production facilities and water treatment facilities.

Figure II-3: 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

Wetlands

The draft National Wetlands Priority Conservation Plan identified Arkansas as one of nineteen states that experienced significant decreases in wetlands from 1954 to 1974. The primary threat to Arkansas's wetlands, most of which are located in the Delta Ecoregion, is conversion to cropland. The conversion rate peaked in the 1960s and is now non-existent. The total wetland base is only a fraction of its original size, making any current losses more critical. 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's streams are classified as high quality, outstanding state or national resources. The designated uses assigned to various water bodies include:

Extraordinary Resource Waters (ERW) (Figure II-4) – This beneficial use is a combination of the chemical, physical, and biological characteristics of a waterbody and its watershed which is characterized by scenic beauty, aesthetics, scientific values, broad scope recreation potential, and intangible social values.

Ecologically Sensitive Waterbody (ESW) (Figure II-5) – This beneficial use identifies stream segments known to provide habitat within the existing range of threatened, endangered, or endemic species of aquatic or semi-aquatic life forms.

Natural and Scenic Waterways (NSW) – This beneficial use identifies stream segments which have been legislatively adopted into a state or federal system.

Primary Contact Recreation – This beneficial use designates waters where full body contact recreation is involved.

Secondary Contact Recreation – This beneficial use designates waters where secondary activities like boating, fishing, or wading are involved.

Fisheries – This beneficial use provides for the protection and propagation of fish, shellfish, and other forms of aquatic life and is further subdivided in these following categories:

- 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

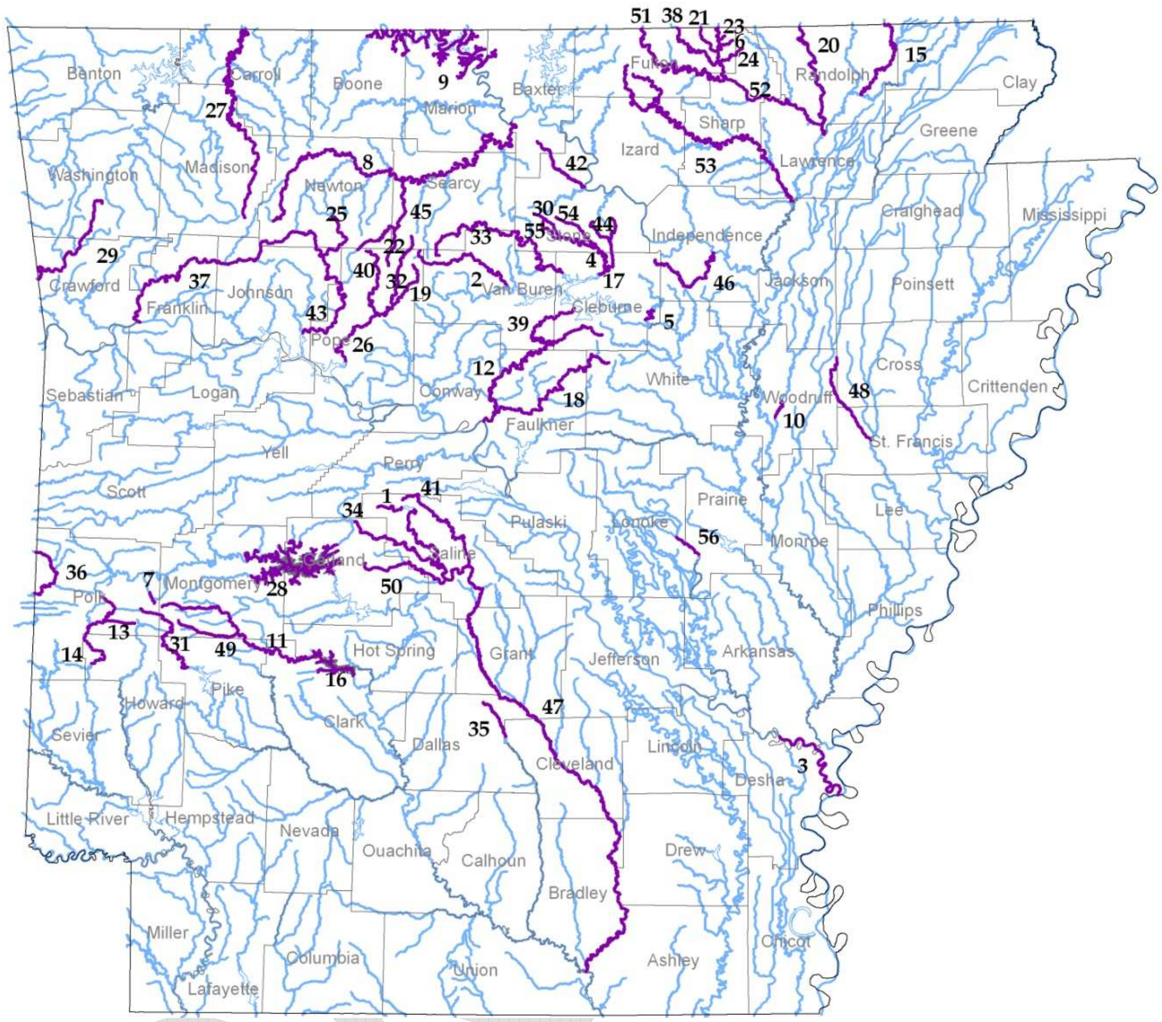
Domestic Water Supply – This designated use designates water which will be protected for use in public and private water supplies.

Industrial Water Supply – This beneficial use designates water which will be protected for use as process or cooling water.

Agricultural Water Supply – this beneficial use designates waters which will be protected for irrigation of crops and/or consumption by livestock.

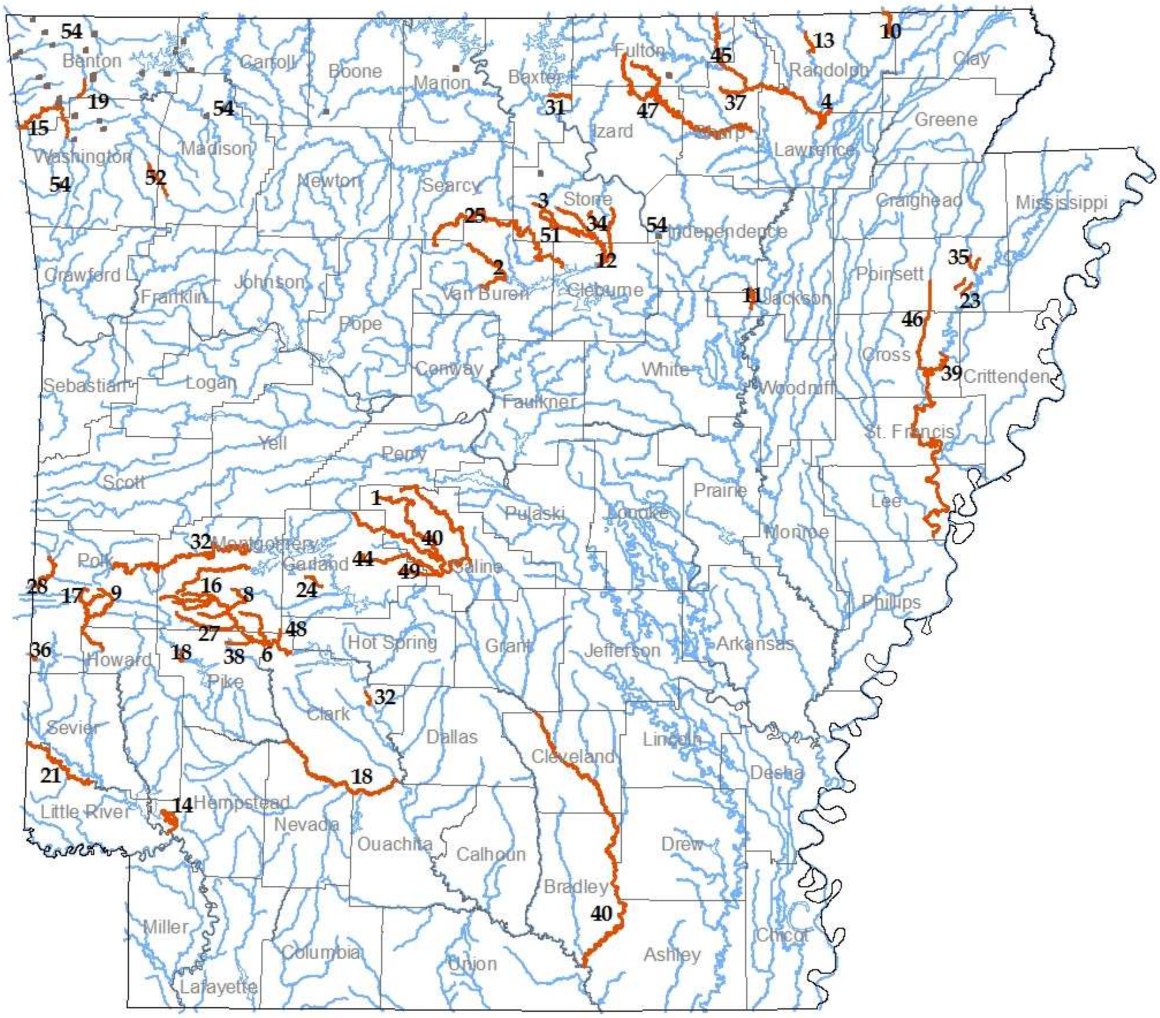
Other Uses – This category of beneficial use is generally used to designate uses not dependent upon water quality such as hydroelectric power generation and navigation.

Figure II-4: Arkansas's Extraordinary Resource Waters



1	Alum Fork Saline River	**15**	Current River	**29**	Lee Creek	**43**	Big Piney Creek
2	Archey Creek	**16**	DeGray Reservoir	**30**	Lick Creek	**44**	Raccoon Creek
3	Arkansas River	**17**	Devils Fork Little Red River	**31**	Little Missouri River	**45**	Richland Creek
4	Beech Creek	**18**	East Fork Cadron Creek	**32**	Middle Fork Illinois	**46**	Salado Creek
5	Big Creek, Cleburne Co.	**19**	East Fork Illinois	**33**	Middle Fork Little Red River	**47**	Saline River
6	Big Creek, Fulton Co.	**20**	Eleven Point River	**34**	Middle Fork Saline River	**48**	Second Creek
7	Big Fork Creek	**21**	English Creek	**35**	Moro Creek	**49**	South Fork Caddo River
8	Buffalo River	**22**	Falling Water Creek	**36**	Mountain Fork River	**50**	South Fork Saline River
9	Bull Shoals Reservoir	**23**	Field Creek	**37**	Mulberry River	**51**	South Fork Spring River
10	Cache River	**24**	Gut Creek	**38**	Myatt Creek	**52**	Spring River
11	Caddo River	**25**	Hurricane Creek	**39**	North Fork Cadron Creek	**53**	Strawberry River
12	Cadron Creek	**26**	Illinois Bayou	**40**	North Fork Illinois	**54**	Tomahawk Creek
13	Caney Creek	**27**	Kings River	**41**	North Fork Saline River	**55**	Turkey Creek
14	Cossatot River	**28**	Lake Ouachita	**42**	North Sylamore Creek	**56**	Two Prairie Bayou

Figure II-5: Arkansas's Ecologically Sensitive Waters



1 Alum Fork Saline River
2 Archey Creek
3 Beech Fork
4 Black River
5 Brushy Creek
6 Caddo River
7 Caney Creek
8 Collier Creek
9 Cossatot River
10 Current River
11 Departee Creek
12 Devils Fork Little Red River
13 Eleven Point River
14 Grassy Lake
15 Illinois River
16 Lick Creek
17 Little Brushy Creek
18 Little Missouri River
19 Little Osage Creek
20 Little Raccoon Creek
21 Little River
22 Little Strawberry River
23 Lower St. Francis River
24 Mayberry Creek
25 Middle Fork Little Red River
26 Middle Fork Saline River
27 Mill Creek
28 Mountain Fork
29 North Fork Saline River
30 Osage Creek
31 Otter Creek
32 Ouachita River
33 Polk Creek
34 Raccoon Creek
35 Right Hand Chute Little River
36 Robinson Creek
37 Rock Creek
38 Rock Creek
39 Saint Francis River
40 Saline River
41 South Fork Caddo River
42 South Fork Little Red River
43 South Fork Ouachita River
44 South Fork Saline River
45 Spring River
46 Straight Slough
47 Strawberry River
48 Sugarloaf Creek
49 Tenmile Creek
50 Tomahawk Creek
51 Turkey Creek
52 White River
53 Yellow Creek
54 Seeps and Springs

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Watershed Approach

Historically, the concept of managing water resources within watersheds originated as early as the 1890s by the U.S. Inland Waterways Commission. During this time and throughout the first half of the 20th century, the focus of water resources management was on efficient use of water resources for energy production, navigation, flood control, irrigation, and drinking water rather than improving water quality. During the 1960s emphasis increased on improving water quality and in 1972 the Federal Water Pollution Control Act Amendment established a national goal of restoration and maintenance of the physical, chemical, and biological integrity of the Nation's waters.

One of the greatest challenges faced today is the conservation and restoration of water resources while promoting the social welfare and the economic well-being of citizens. Arkansas has an abundance of safe drinking water from rivers and lakes, spectacular recreational places that support numerous outdoor activities, and a diverse range of habitat that support a variety of wildlife. All of these qualities give Arkansas the reputation of being the Natural State.

Use of our natural resources contributes to the economic foundation of Arkansas, but how we use the land can affect the quality of our State's water resources. We must manage our resources in a way that results in conservation and protection of the State's scenic areas and restoration in places that have already been degraded. The watershed approach addresses multiple causes of environmental degradation, needed restoration, and future conservation. It uses hydrologically defined areas (watersheds) to coordinate the management of water resources and is advantageous because it considers all activities within a landscape that affect watershed health. This approach integrates biology, chemistry, physiography, economics, and social considerations into national and state goals and regulations. A watershed approach recognizes needs for water supply, water quality, flood control, navigation, hydropower generation, fisheries, biodiversity, habitat preservation, and recreation; it also recognizes that these needs often compete.

The watershed approach for water quality management in Arkansas was initiated in the early to mid-1970s with the development of Water Quality Planning Segments. In accordance with Section 303(e) of the Clean Water Act (CWA), wasteload allocation studies to establish Total Maximum Daily Loads (TMDLs) for waters in each segment were performed. 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 boundaries in EPA's River Reach File. This allows geographic information system (GIS) support with designation, characterization, assessment, and management.

The watershed approach provides a framework where local programs can make educated choices about managing their natural resources. In Arkansas, the Arkansas Watershed Advisory Group (AWAG), coordinated by the Department, brings citizens and environmental professionals together to network about watershed topics of concern. AWAG began in 2000 with 21 agencies and organization and four citizens; it currently consists of over 48 local, state, and federal agencies; nonprofit organizations; and watershed councils (Figure II-6). The mission of the AWAG is to assist citizens and organizations by promoting local approaches to watershed management and conservation.

Four goals were established during the formation period and many activities and programs have addressed those four goals during the past five years.

Goal Statement I: "Promote the public's interest, understanding, and involvement in the management of their watershed resources"

Watershed Awareness Days, local public awareness events, are hosted in watersheds across the State and provide interaction between agencies, organizations, and local citizens. Citizens are given the opportunity to learn more about programs designed to protect their natural resources at the local, voluntary level while scientists and natural resource managers are given the opportunity to meet residents of the watershed and gain valuable local information.

Workshop topics have included grant writing, Gulf of Mexico hypoxia, water quality, political agendas, recent legislation, and watershed management. The Department watershed coordinator is also available to meet with small groups or individuals to provide direction concerning watershed planning.

Goal Statement II: "Improve communication concerning watershed resources"

The AWAG has encouraged interaction and communication among citizens, agencies and organizations by hosting Roundtable Discussions, quarterly AWAG meetings, and biennial statewide AWAG Conferences. The primary method of communication between AWAG partners is the AWAG listserve and email. Other forms of communication are direct communication with watershed coordinators, quarterly newsletters, website, and presentations at local environmental events.

Goal Statement III: "Assist in providing technical support concerning watershed resources"

The AWAG representatives are committed to providing planning and technical assistance to watershed groups across Arkansas. A watershed group can request a technical advisor and a planning advisor attend meetings to help with group facilitation and watershed planning during the initial formation period. The technical advisor will continue to provide technical support after the formation period and assist with project planning and implementation.

Goal Statement IV: "Assist with funding issues for watershed resource management"

AWAG has focused on building sustainable watershed groups by providing assistance in formation and planning. The advisory group has hosted regional grant writing workshops which have produced several grants for watershed groups. A nonprofit information packet was created to provide watershed groups with checklists, state and federal forms, and sample bylaws and articles of incorporation. The Department watershed coordinator is also available to assist in filling out the federal forms. Funding opportunities are posted in the Watershed Watch, on the AWAG website, and on the AWAG listserv.

Figure II-6: Participating Agencies, Organizations, and Watershed Councils

AGENCIES

Arkansas Attorney General's Office
Arkansas Dept. of Environmental Quality
Arkansas Dept. of Health
Arkansas Dept. of Parks & Tourism
Arkansas Forestry Commission
Arkansas Game & Fish Commission
Arkansas Geological Commission
Arkansas Highway & Transportation Dept.
Arkansas Natural Heritage Commission
Arkansas Natural Resources Commission
Arkansas State Plant Board
Arkansas State University
Pulaski Technical College
U of A at Fayetteville
U of A Cooperative Extension Service
U of A at Pine Bluff
U.S.D.A. National Park Service
U.S.D.A. Natural Resources Conservation Service
U.S.D.A. Agriculture Research Service
U.S. Army Corps of Engineers
U.S. Fish & Wildlife Service
U.S. Forest Service
U.S. Geological Survey

ORGANIZATIONS

Arkansas Association of Conservation Districts
Arkansas Canoe Club
Arkansas Farm Bureau
Arkansas Rural Water Association
Arkansas Watershed Advisory Group
Audubon Arkansas
Beaver Lake Scientific Work Group
Beaver Water District
Central Arkansas Water
Heifer International
The Nature Conservancy
Watershed Conservation Resource Center
Winrock International

WATERSHED GROUPS

Arkansas Rivers Association
Association of Beaver Lake Environment
Bayou Bartholomew Alliance
Beaver Watershed Alliance
Cache River Partnership
Citizens Protecting Lake Maumelle
Fourche Creek Coalition
Illinois River Watershed Partnership
Kings River Watershed Partnership
L'Anguille River Watershed Coalition
Lake Fayetteville Watershed Partnership
Leatherwood Creek Watershed Partnership
Multi-Basin Regional Watershed Council
Ozarks WaterWatch (UWRB)
Trout Unlimited (Lower Little Red River)
Lower Mississippi River Conservation Committee
Lower White River Partnership
Alliance for Improvement of Middle Fork Saline River (AIM)
Friends of North Fork/White River
Save Our Spring River
West Fork of the White River Environmental Protection Association

Lee Creek, Crawford County, AR

Water Quality Standards

Surface Water

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

Specific criteria to protect the designated uses of each water body 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 fisheries designated use support, which includes community structure as well as toxicity limitations.

Standards were developed with data from least-disturbed reference streams with characteristics most typical of a particular Level 3 ecoregion. A single ecoregion can span from one edge of the State to the other and encompass two or three major river basins. The physical, chemical, and biological characteristics of one river basin within a particular ecoregion may or may not be similar to the characteristics of the other river basins in the same ecoregion. In addition, the characteristics of transitions zones between ecoregions, the transition zone of a stream from a highland stream to a lowland stream, and the areas within atypical features of ecoregions may or may not be similar to typical ecoregion characteristics. Therefore, provisions are established in the water quality standards to allow modifications of the criteria and the designated uses of specific water bodies based on current uses, the level of classification of the waterbody, and the social and economic needs of the area of concern.

Groundwater

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

In addition to the Water Division, divisions within the Department which protect groundwater include the Hazardous Waste Division, the Solid Waste Division, and the Regulated Storage Tank Division. The Department's Brownfields Program has adopted the Region VI Human Health Media-Specific Screening Levels. Methodologies and standards for risk assessment evaluations at contaminated sites have been established and adopted. Emphasis on risk assessments demonstrates the difficulty of simply establishing numerical standards for all contaminated sites within the State. Establishment of groundwater quality standards must be done in a manner that will augment existing departmental regulations, provide a uniform, statewide set of criteria for defining and addressing groundwater contamination, and fill existing gaps in groundwater protection. A preliminary review of standards from other states and initial discussions with groundwater staff and management were completed in 2008 and 2009. A number of important issues regarding the development of groundwater standards were identified. These include fundamental policy decisions such as a non-degradation policy versus a risk based or numeric cleanup standard, the involvement of stakeholders, coordination between applicable state agencies, and legislative support. It is apparent that these policy issues must be addressed by management in the preliminary stages of groundwater standard development.

Regardless of the established authority of the Department, in recent years the task of developing groundwater quality standards has been undertaken by the Arkansas Natural Resources Commission (ANRC). The ANRC has developed a model for standards development and is currently working on a set of draft groundwater quality standards. The draft document of numerical standards is near completion and should be available for review in early 2012.

Point Source Control Program

The State of Arkansas continues to administer the National Pollutant Discharge Elimination System No-Discharge Program (formerly the State Permits Program), which was initiated in 1949. On November 1, 1986, EPA delegated the NPDES program to the State. This program is administered by the Permits Branch of the Water Division.

In accordance with the federal CWA, Section 303(e), Arkansas maintains a "continuing planning process (CPP)" to integrate the NPDES Program, the State's water quality standards, and the Water Quality Management Plan (WQMP). The WQMP is the controlling document for issuing 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 CWA.

The No-Discharge Section of the Permits Branch issues permits relating to waste disposal systems that do not discharge directly to the Waters of the State. These systems are most commonly located at confined animal facilities, commercial facilities with septic tanks and leach fields, and centralized or decentralized wastewater treatment systems for residential developments. Permits are also issued for the 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 drilling fluids from oil and gas field exploration activities. In addition, the Program manages the Underground Injection Control Program, in conjunction with the Arkansas Oil and Gas Commission, and issues permits for salt-water disposal systems.

The Individual Permits Section of the Permits Branch administers Arkansas's NPDES program, which is patterned after the EPA program utilizing federally approved forms for permit application and monitoring reports. The Department has adopted, by reference in Regulation No. 6, most of the federal regulations applicable to a wastewater discharge permitting program. The distribution of Arkansas's major and selected minor NPDES permits is illustrated in Figure II-6.

Storm Water Requirements

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

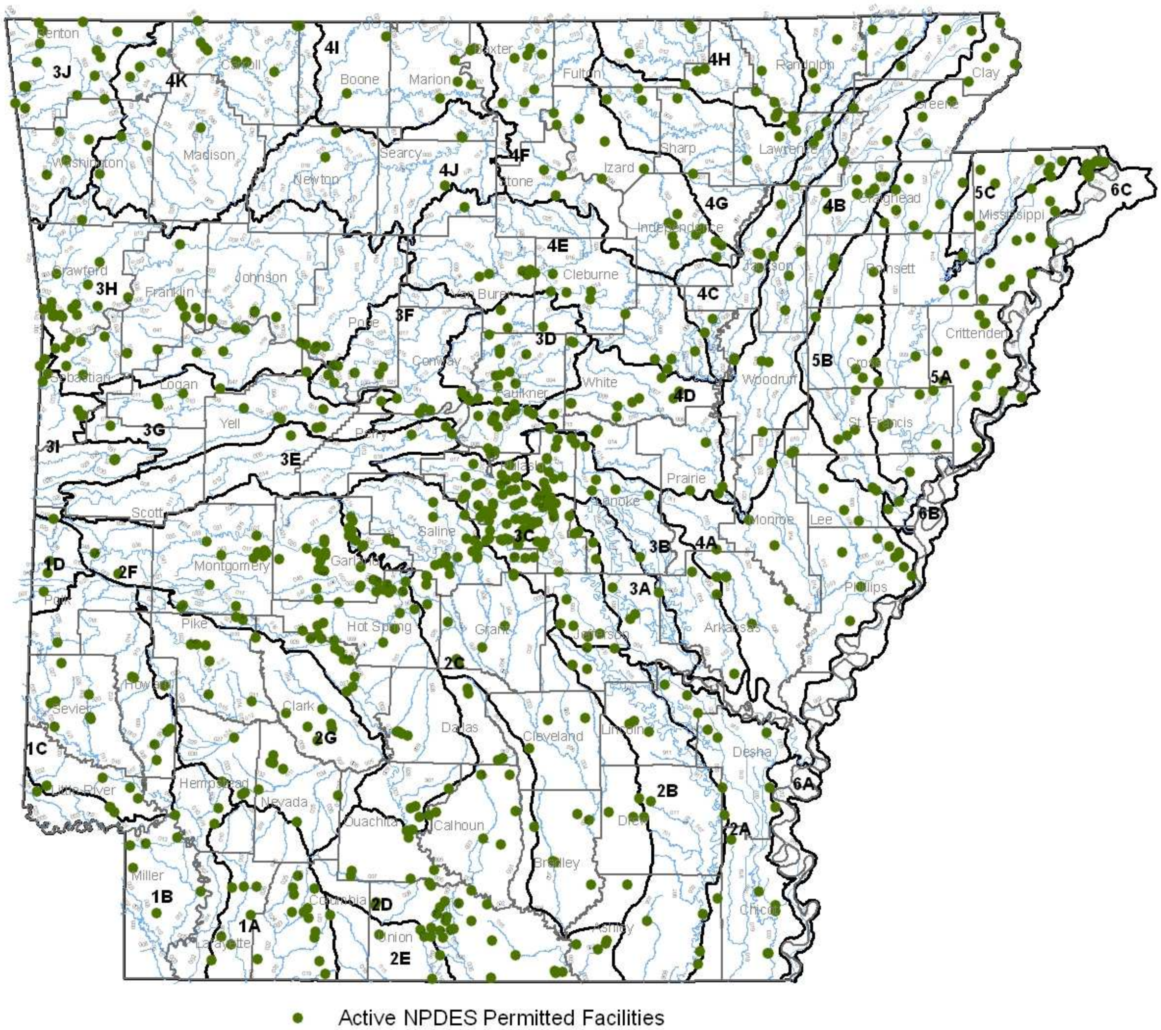
Industrial Stormwater General Permit (ARR000000) covers many industry types that are required by federal regulation to obtain permit coverage based on the specific Standard Industrial Code (SIC) or specific industrial activity. All industries covered under the Industrial Stormwater General Permit (IGP) are required to monitor for four basic parameters (TSS, COD, Oil and Grease, and pH) twice per year. In addition, some industries, based on the specific industrial sector defined in the IGP, are required to monitor for additional parameters. Facilities with permit coverage must conduct quarterly visual inspection. They are also required to conduct a comprehensive site evaluation once a year. They must schedule and conduct corrective action if their monitoring results indicate parameter benchmark exceedance. The two monitoring results, visual inspection, comprehensive site evaluation, four visual inspections and any corrective action if needed must be included with the annual report, due no later than January 31 of each year. This general permit requires the development of a SWPPP using BMPs to address the reduction in pollutants exposed to the storm water runoff and/or removal of the pollutants after the storm water has been contaminated. The SWPPP must include a list of personnel that will inspect the facility, a non-storm water discharge certification, good housekeeping, spill prevention and response, and inventory of exposed material.

Industries that do not have any part of their operation exposed to stormwater may submit a no exposure certification request to be covered under no-exposure. Facilities with a no-exposure certification are not required to develop a SWPPP, monitor, or submit an annual report.

The Small Municipal Separate Storm Sewer System (MS4) General Permit (ARR040000) covers all of the regulated Small MS4s in the State. This general permit requires the development of a Storm Water Management Plan (SWMP) to address the six minimum control measures: public education, public participation, illicit discharge detection, construction site control, post-construction control, and good housekeeping, as required by federal regulation. Each Small MS4 permittee with coverage under this general permit is required to submit an annual report explaining the different activities carried out under their SWMPs that year.

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

Figure II-7: NPDES Permitted Facilities



Point Source Impacts Monitoring

The impacts from major point source discharges of concern are monitored primarily through strategically located water quality monitoring stations within the statewide Ambient Water Quality Monitoring Network. The water quality data collected at these stations enable the Department to monitor the discharges from the permitted facilities and identify areas of concern needing enforcement or some other type of abatement activity. The data can also indicate improvement of water quality conditions resulting from pollution control activities. In addition, self-monitoring through monthly discharge monitoring reports is required in the NPDES permits of most dischargers (see Enforcement).

Toxics Strategy

Since FY 1987, 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 implicit intent of the toxics strategy is that there shall be no discharge of any wastewater from any source that:

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

The toxicity testing program consists of both self-monitoring conducted by the permittees and compliance monitoring conducted by the State. The State has been and will continue to implement the post-third round permit policy endorsed by EPA Region 6, with minor revisions. Whole effluent toxicity testing requirements are included in all major and selected minor permits.

In 1991, the Commission adopted specific numeric criteria for 12 pollutants in terms of their acute and chronic toxicity (Reg. 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 State's water quality standards.

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

Self-Monitoring for Toxicity

Whole Effluent Toxicity (WET) testing's objective is to estimate the no observed effect concentration (NOEC) of a facility's effluent. The NOEC is defined as the concentration which will allow normal propagation of fish and other aquatic life in the receiving waters.

Chronic toxicity tests are conducted for a period of seven (7) days and utilize the Fathead minnow (*Pimephales promelas)* and the water flea (*Ceriodaphnia dubia).* The endpoints that are considered to determine adverse effects of toxicants for the Fathead minnow are survival and growth. The endpoints that are considered to determine adverse effects of toxicants for the water flea are survival and reproduction.

Acute toxicity tests are conducted for a period of forty-eight (48) hours and utilize the Fathead minnow (*Pimephales promelas)* and the water flea (*Daphnia pulex).* The endpoint that is considered to determine adverse effects of toxicants for the Fathead minnow is survival. The endpoint that is considered to determine adverse effects of toxicants for the water flea is survival.

WET testing is included in the major and significant minor industrial NPDES permits. WET testing is also included in both major and minor municipal NPDES permits and in one Federal permit.

When a facility's effluent experiences a certain number of toxic events, a Toxicity Reduction Evaluation (TRE) will be required. A TRE is an investigation intended to determine those actions necessary to achieve compliance with water quality-based effluent limits by reducing an effluent's toxicity to an acceptable level. A TRE is defined as a step-wise process which combines toxicity testing and analyses of the physical and chemical characteristics of a toxic effluent to identify the constituents causing effluent toxicity and/or treatment methods which will reduce the effluent toxicity. The goal of the TRE is to maximally reduce the toxic effects of effluent at the critical dilution. Depending on the results of the TREs, a facility will have either corrected treatment issues, relocated the effluent discharge, improved treatment capabilities, or will have lethal and/or sub-lethal WET limits in their NPDES permits.

The NPDES General Permit number ARG790000, Groundwater Clean-Up Located within the State of Arkansas, authorizes the discharge of treated groundwater/surface water that may have been contaminated with petroleum fuels. Determinations of coverage under this general permit are issued for short duration discharges, which sometimes only last for several months. The initial general permit was first issued on April 10, 1990. The initial general permit contained monthly acute WET testing requirements for all treated groundwater discharges, which included all permittees covered by the general permit. The monthly acute WET testing requirements were continued with the issuance of the renewal permit on 01March1995, 01February2001, 01April2006, and 01April2011.

Certification of Monitoring Data

Pursuant to the provisions of Act 322 of the 79th General Assembly of 1993, the 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 November 1, 2011, 78 environmental testing laboratories have received certification from the State of Arkansas. Twenty-four of those are located in Arkansas.

Enforcement

The Enforcement Branch of the Water Division implements the NPDES enforcement program. The primary basis for enforcement is self-monitoring data submitted by permittees on monthly discharge monitoring reports (DMRs) and routine compliance inspections performed by the Department. All DMR data are entered into the Integrated Compliance Information System (ICIS) national database. The State addresses all permit violations reported by permittees through an initial informal enforcement action. 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 since 1971. Act 1103 of 1991 added the requirement for the licensing of industrial operators. There are approximately 3000 licensed operators in Arkansas, which includes both municipal and industrial operators. Classification of wastewater treatment plants by the unit processes determine the level of operator staffing and the licensing level of the plant operators.

Most training of wastewater treatment plant operators is accomplished by the Arkansas Environmental Academy, a branch of Southern Arkansas University located at Camden, Arkansas, and the Arkansas Rural Water Association, Lonoke, Arkansas. Over 70 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.

Nonpoint Source Control Program

In 1988, the Department conducted a nonpoint source assessment and prepared a management plan pursuant to Section 319 of the CWA, 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 former Arkansas Soil and Water Conservation Commission, now the Arkansas Natural Resources Commission (ANRC), was designated as the Nonpoint Source Program Management Agency and the lead agency for the Agriculture nonpoint source category; the Arkansas Forestry Commission assumed the responsibilities for the Silviculture category; the Department has retained the responsibility of assessing and reporting on nonpoint source pollution and the responsibilities associated with Resource Extraction (mining); and the University of Arkansas Division of Agriculture, Cooperative Extension Service for education outreach. The Department and ANRC share the responsibilities of the Surface Erosion, Urban Runoff, and Road Construction / Maintenance categories. The Nonpoint Source

Management Task Force prioritizes watersheds by the use of a matrix approach. The 8-digit HUCs are further broken down into 12-digit HUCs to facilitate focus in implementing projects in critical areas. In addition, both of these entities and numerous other cooperators lend assistance and/or support to each of the priority watersheds.

Assessment

The initial Arkansas Nonpoint Source Pollution Assessment in 1988 assessed approximately 36 percent of the 11,900 stream miles in the State. Based on assessment criteria established in 1988, 58 percent of the assessed streams were not meeting all designated uses. Limited data for the 79 significant publicly owned lakes indicated no use impairment. There were 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 in the State.

The 1988 assessment was updated in June 1997 using updated assessment criteria. The 1997 report assessed 8,700 stream miles and indicated that NPS pollution was impacting (but not necessarily impairing) over 4,100 stream miles. Agricultural activities were identified as the major cause of impacts on 3,197 stream miles. Other 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, the Department no longer publishes a separate nonpoint source assessment report. This document, updated every two years, serves as the nonpoint source assessment report.

Management Program

The Arkansas Nonpoint Source Pollution Management Plan is developed and implemented by ANRC. It provides for continued monitoring of water quality, demonstrations of the effectiveness of BMPs, and implementation strategies of BMPs to reduce nonpoint source pollutants. In 2006, and in each year since then, ANRC and its subsequent Nonpoint Source Management Program section have and continue to initiate annual meetings of the Nonpoint Source Management Task Force (Task Force). The Task Force utilizes new or updated information and data to incorporate into a 12-tiered risk matrix approach to adjust and/or allocate resources and support, when appropriate, to emerging or changing conditions. This approach also facilitates stakeholder participation. Although the Arkansas Nonpoint Source Management Plan is printed every 5 years, updates to the plan occur annually. Additional information regarding the Program including past projects and links to additional information can be accessed by visiting www.arkansaswater.org

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Chapter Three COST /BENEFIT ANALYSIS

The CWA requires states to provide an estimate of the environmental, economic, and social costs, and benefits needed to achieve CWA objectives and an estimate of the date of such achievement. A comparable procedure is needed to conduct a state-wide economic analysis of environmental, economic and social costs.

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

Recent advances in valuing benefits such as ecological services may provide insight into the true benefits of CWA regulations that have not been represented economically in previous assessments. However, protocols for including those benefits are not yet established. Therefore, pertinent accessible information has been utilized for this water quality CBA in order to provide the required information under the CWA.

An extensive cost benefit analysis was completed by an independent contractor in 2005. Since that time the Department has not had the resources to contract another such comprehensive assessment. Therefore, some cost/benefit information has been updated with the most current and readily available data while other data remain from the original cost/benefit analysis from 2005.

Cost Information

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

The costs for implementing CWA regulations are summarized as agency programmatic implementation expenses, pollution abatement capital expenditures, and operating costs. Much of the water quality related budget is self-generated through permit fees; however, a portion is derived through federal grants. These include the §104 grant for research investigations, training and informational demonstrations; §106 grant for water pollution control activities; the §319 grant for nonpoint source management issues, and the §604 grant for state water quality management planning activities. Funds from these grants are divided throughout the appropriate water-quality related state programs as directed by each grant, and provide funding for personnel, equipment, survey and research work, and ambient monitoring. Total costs for FY 2010 were estimated at over $13.8 million.

State of Arkansas Budget for Water Quality Control Activities

The Department has primary responsibility for permitting and enforcement of CWA provisions in Arkansas, but the implementation of water quality control activities are distributed across several state agencies, including the Department, ANRC, Arkansas Department of Health, Rural Water Association of Arkansas, and the Arkansas Division of Agriculture, among others.

Federal CWA Section 106 Budget

The §106 grant program provides funding for the Department's general water pollution control/water quality management program. Activities funded under the §106 grant include ambient water quality monitoring, assessment of ambient water quality data, development of the *Water Quality Inventory* (now known as the Integrated Report), revision of Arkansas's Water Quality Management Plan, development and revision of surface water quality standards, development and issuance of waste water discharge permits (NPDES Program), compliance inspections, complaint investigations, and development of enforcement actions. In 2010, the Department received just over two million dollars in Federal funding for these activities.

Federal CWA Section 319 Budget

The Clean Water Act §319 grant for nonpoint source management issues in Arkansas is implemented by the Arkansas Natural Resources Commission (ANRC). The Arkansas Natural Resources Commission works with universities, city and regional officials, private industries, and the federal governments to prevent, control, and remediate nonpoint source pollution throughout Arkansas. Part II, Chapter 2, Nonpoint Source Pollution Control has more information about the Nonpoint Source Program. In 2010, ANRC received more than $3,700,000 in Federal funding for these activities.

Federal ARRA Funds

American Recovery and Remediation Act funds, administered through Section 604 of the CWA, are being used to develop total maximum daily loads (TMDL) for streams not meeting water quality standards. These TMDLs will assists permit writers and watershed managers in establishing effluent limits and management practices to protect and restore water quality in the listed streams. In 2010, the Department utilized $77,700 in Federal funding for these activities.

Benefits Information

The benefits of implementing the Clean Water Act are numerous and obvious. Recreational, industrial, and municipal uses are dependent upon clean, safe water.

Tourism and Recreation

Over $5.5 billion in revenue was generated for Arkansas in 2010 for all tourism. A conservative estimate for tourism revenue that directly benefited from implementation of the Clean Water Act would be 10% or $550 million.

According to the U.S. Fish and Wildlife Service, in 2006 (the most recent data available) just over $2 billion were realized in Arkansas for total wildlife related expenditures (hunting, fishing, and wildlife watching). The quality of all these recreational activities is directly related to the quality of water in Arkansas. A conservative estimate for wildlife related expenditure revenue that directly benefited from implementation of the Clean Water Act would be 10% or $200 million.

Aquaculture

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

Warm-water (smallmouth bass, striped bass, and walleye) and cold-water (trout) fisheries is another economically important industry for Arkansas. Arkansas has five hatcheries operated by the AR Game and Fish Commission (AGFC) and three National Fish Hatcheries (NFH). According to the US Fish and Wildlife Service (USFWS), for every dollar spent by Norfork NFH, $94.98 is generated with a total economic output of $90.4 million (2010 dollars). For every tax dollar spent for recreational fish production at Mammoth Spring NFH $12 of net economic value is created resulting in a total economic output of more than $1.5 million every year. Greers Ferry produces an annual economic impact of $45.7 million (1999 dollars) between Arkansas and Oklahoma. Collectively, NFHs are capable of generating more than $137 million annually.

Water-Critical Industry

The principal industries in Arkansas are manufacturing, agriculture, forestry, business services, and tourism (Table II-1) which accounted for 12.5% of Arkansas's general revenue in 2010, or over $12.8 billion. These industries are dependent upon, and thus benefit from, high quality water resources. A conservative estimate for industry revenue that directly benefited from implementation of the Clean Water Act would be 10% or $1.28 billion.

Table II-1: Economic Benefits from Industries in Arkansas by Category, 2010

Industry Category	2010 Revenues (billion)	Percent GSP ($102.566 billion)
Agriculture, Forestry & Fishing	$2.872	2.8
Nondurable Goods Manufacturing industry	$7.489	7.3
Accommodation and Food Services industry	$2.49	2.4
TOTAL	**$12.851**	**12.5**

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

Summary of Benefits

The cumulative benefits of implementing CWA programs in Arkansas for the most current data available were estimated to be more than $2.137 billion (Table II-2). These assumptions were conservative (that is, likely underestimated) to account for overlap in economic sources and other variables. These estimates do not consider other critical benefits that were not available for this CBA, including the cost of water treatment for drinking water, the health effects of untreated poor quality water, etc.

Table II-2: Summary of Benefits Associated with Implementing CWA Programs in Arkansas for most current year available.

Economic Source	**Principal Activities**	**Economic Benefits* (Million)**
Tourism	Water recreation, sightseeing, etc.	550
Aquaculture	Propagation of sport fish	137
Wildlife	Hunting, fishing, and wildlife watching	200
Industry	Manufacturing, agriculture, forestry, business services, and tourism	1280
	TOTAL	**2137**

***Estimate based on total revenue for source.**

Cost/Benefit Assessment

The costs/benefits calculated in this report remain conservative as there is no estimate of cost/benefits of academia (University professors, graduate research, etc.), professional industries (private environmental consulting firms, etc.) or other specialized industries that play a role in water conservation. It would be inappropriate to make conclusions on a true cost/benefit assessment without considering all of these cost/benefits for a single fiscal year. However it can be stated that the costs to implement the CWA in Arkansas is far less that the $2137 million the state sees in benefits.

LITERATURE CITED FOR CHAPTER THREE

http://www.arkansas.com

U.S. Department of the Interior, Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

http://www.uaex.edu/aqfi/research/

http://www.fws.gov

http://www.agfc.com/resources/Publications/2009_10_harvest_report_web.pdf

http://www.arkansas.com/!userfiles/apt_2011_annual_report.pdf

http://www.census.gov/prod/2008pubs/fhw06-ar.pdf

http://www.bea.gov/regional/gsp/

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Areas of special concern within the State's Water Pollution Control Program include many of the national concerns and priorities. 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 ideas which are likely to shape future activities.

1. There continues to be a substantial increase in federal mandates placed on states that receive federal funds. However, there has been no increase in federal funding to implement the mandates and no increase in funds to account for inflation over the past 14 years. Thus, non-federal resources have been reassigned to meet the mandates resulting in a lack of resources to accomplish other tasks.

2. Evaluating waterbodies as impaired based on limited data sets, inappropriate water quality standards, or "one size fits all" assessment criteria results in the development of unnecessary total maximum daily loads and/or the implementation of unnecessary stricter permit limits and expensive pollution reduction activities. Since 2001, 250 TMDLs for water quality constituents have been developed for state waterbodies. Almost 44% of those constituents have been assessed as fully meeting water quality standards in this report. The attainment of water quality standards in the majority of these waterbodies has not been because of the implementation of the TMDLs. In some cases, it is simply a reflection of the natural fluctuations in water quality that occurs from one year to the next. In other cases, it is the result of a more sensitive evaluation methodology which better reflects the many unique water quality characteristics of Arkansas's waterbodies. In yet other situations it is the result of evaluating a more extensive data set that fully represents the actual ambient conditions of the waterbody.

3. The development of TMDLs for waterbody constituents that are exceeding water quality standards but are the result of "naturally occurring conditions," or for constituents that the implementation of a TMDL would not result in the attainment of water quality standards (i.e. mercury in fish tissue), is not a sensible use of resources. Over 50% of the TMDLs that have been developed for Arkansas waterbodies since 2001 fit into this category. The policy of producing TMDLs for the sole purpose of meeting an arbitrary annual "TMDL Development Pace" consumes valuable resources that should be used to address higher priority issues.

4. Promulgation of groundwater standards which reflect existing water quality in different aquifers and different regions of the State similar to the ecoregion approach.

5. As the need continues to move from ground water to surface water for irrigation purposes, more and more waterways are being used as a transport mechanism for irrigation waters without regard to their designated uses or ecological impacts. The long-term effects on the physical, chemical, and biological aspects of these waterways are not known. This activity can and does have devastating effects on these ecosystems.

6. 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.

7. 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.

8. Formation and sustainability of local watershed groups to generate local support and assist local governments in developing and implementing watershed restoration management plans for both surface and groundwater resources.

9. The conversion of streams to reservoirs under the provision of "drinking water supply" threatens the State's highest quality and most ecologically important streams.

PART III SURFACE WATER ASSESSMENT

Chapter One SURFACE WATER MONITORING PROGRAM

Arkansas has been monitoring its streams and rivers for almost 50 years. What began as a few sites in the 1960s has now expanded to more than 150 permanent sites and more than 200 rotating sites across the state (Figure III-1). The current monitoring program operates under four goals: 1) to better assess the effects of point source discharges upon water quality; 2) to observe the impact of known nonpoint source inputs over time; 3) to continue monitoring the major rivers due to their basic importance to the State; and 4) to monitor the carefully selected, high quality (least impaired) streams to provide long term chemical data by physiographic region for use in future water quality standards revisions. The Department's monitoring program is thoroughly outlined in, "State of Arkansas Water Quality Monitoring and Assessment Program, Revision 3, March 2009."

If a waterbody is assessed as impaired using the data collected from the permanent or rotating stations, a special or intensive survey may be implemented. These surveys are usually on a watershed or site specific scale and can include biological and/or special needs data collection dependent upon the impairment. Figure III-2 shows special project sites within this period of record.

Table III-1: Recent Special Survey Projects (4/1/2006 to3/31/2011)

Name	Project Year(s)
Type B Reference Lake Identification	2010 to present
White Oak Bayou	2010 to present
Type C and D Reference Lakes Data Collection	2009 to present
Upper Saline Watershed Nutrient Criteria Development and MBMI Pilot Project	2006 - 2010
Cove Creek Physical, Chemical, and Biological Community Assessment	2007
Inventory of Biotic Assemblages for Cedar, Cove, Lee, and Webber Creeks	2009-2010
Assessment of Ecoregion Reference Streams	2009-2010
Physical, Chemical, Biological Assessment of Town Branch, Little Sugar, and McKissic Creeks	2009-2010
Aquatic Life Use Attainment Determination of Selected Category 5F Waters Listed on the 2008 List of Impaired Waterbodies	2009-2011

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

Figure III-1: Water Quality Monitoring Stations

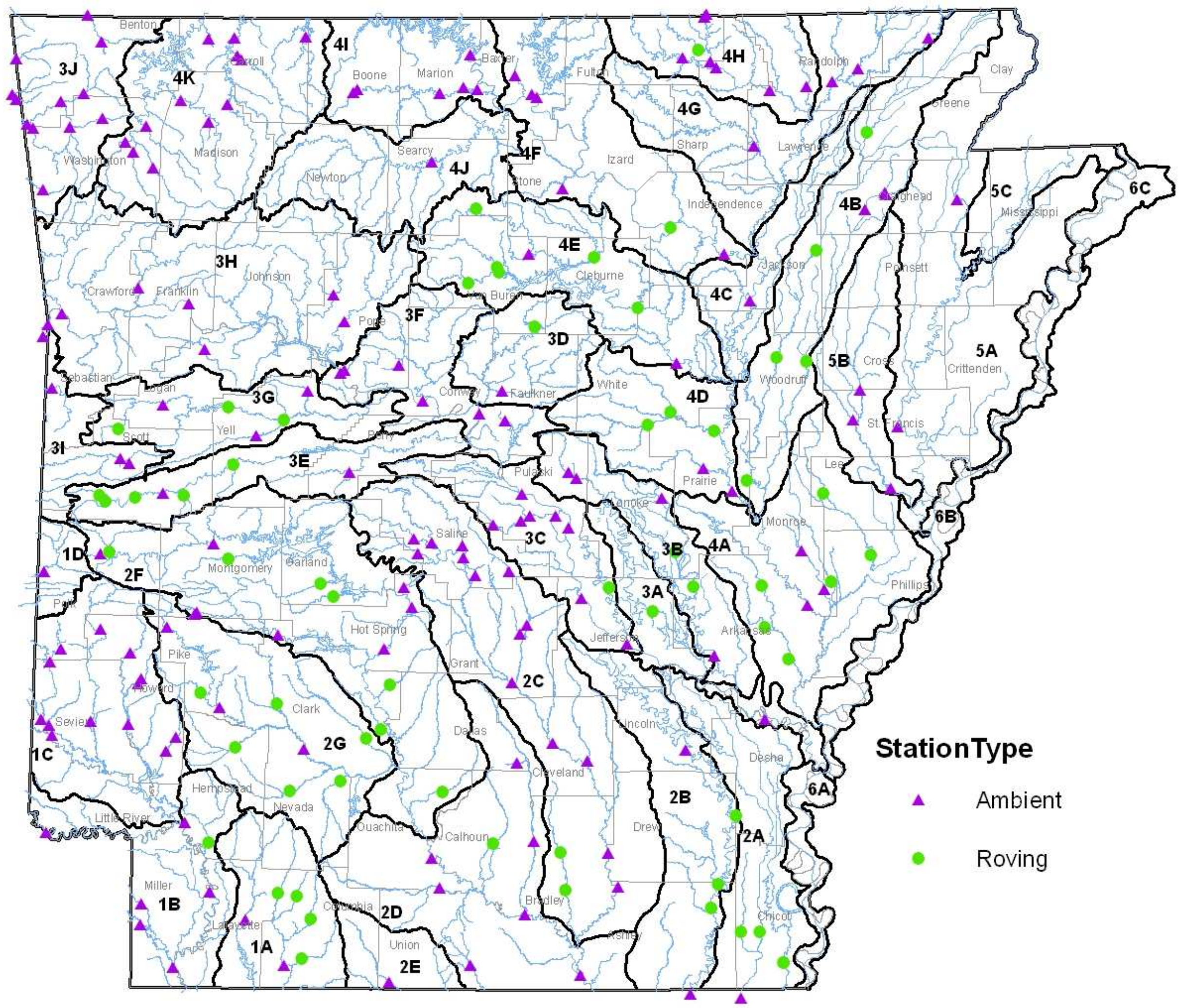
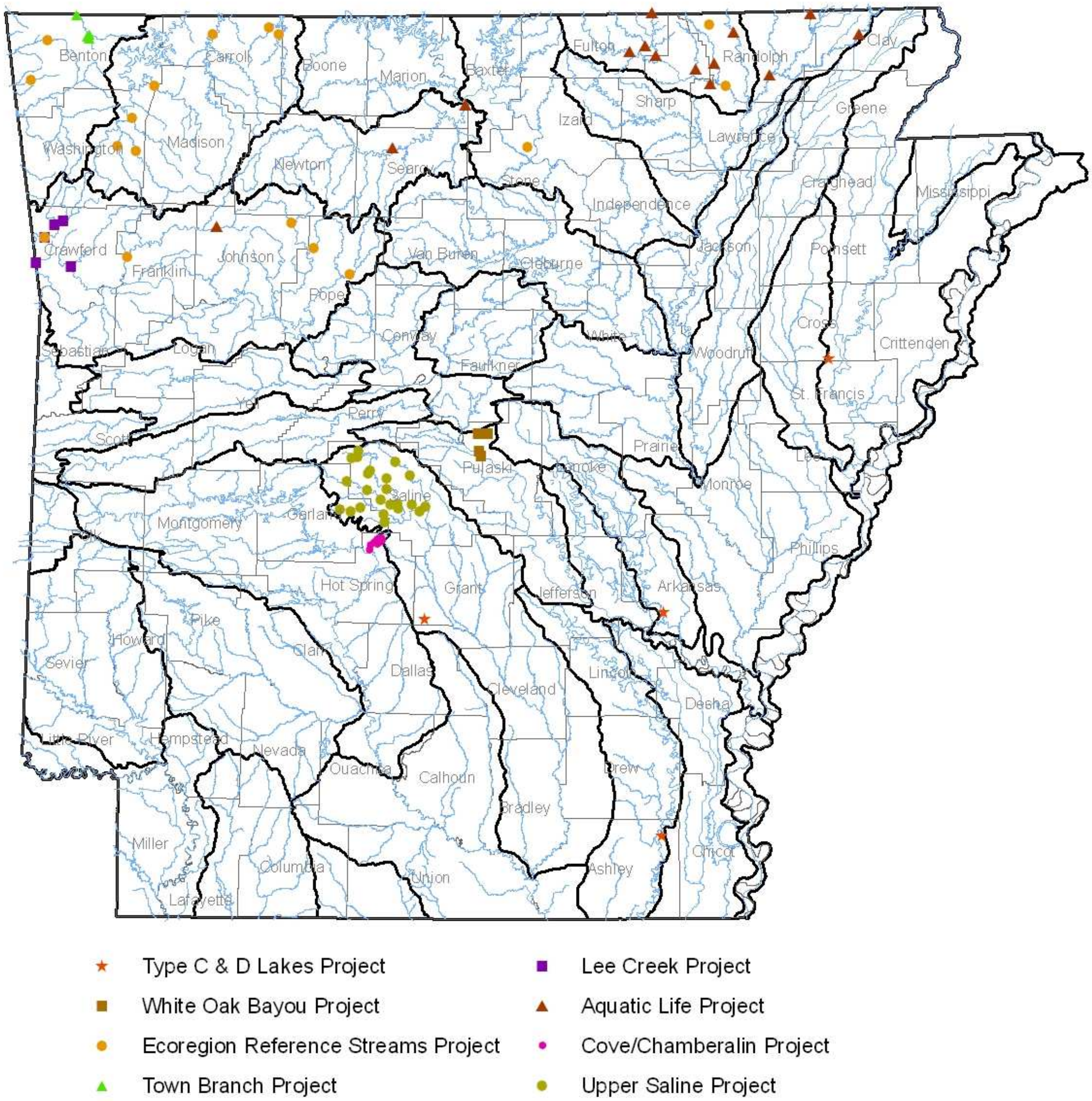


Figure III-2: Special Projects Monitoring Waters



Biological Testing Programs

The Department maintains a monitoring system to evaluate the environmental impacts of pollutants on aquatic life and human health. Monitoring programs include macroinvertebrate and fish community assessments; fish tissue analyses for contaminants, which may be harmful for human consumption; sediment testing for pesticides, toxic chemicals, and heavy metals; EPA Ambient Toxicity Monitoring Program (results available at http://www.epa.gov/earth1r6/6wq/ecopro/watershd/monitrng/toxnet/index.htm); 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.

Macroinvertebrate 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. The Department has conducted biological community monitoring throughout the State since the 1970s. Current biological collection methods are based on EPA's Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers (EPA 8-11-B-99-002).

Bacteriological Program

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

In Arkansas, the "Water Quality Monitoring and Assessment Program" has been very progressive and is one of the more intensive programs in the Nation (see Part III Chapter l). However, it is primarily limited to chemical monitoring of the water quality using long term, fixed, and specifically targeted stations. Objectives of the program 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: 1) the ability to assess the use attainment status of the State's waters; 2) monitor long-term trends in least-disturbed areas; 3) monitor rapidly developing areas of the State; and 4) detect sudden changes in water quality of the State's waters. In addition, the program 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, and suspended solids values for permit implementation procedures.

The current basic water quality networks in Arkansas are statewide in scope; consisting of a group of fixed stations which are sampled monthly and a group of roving stations that are sampled bimonthly. These networks are facilitated by either the regionally located field personnel or personnel from the central office. To convert the program to a solely probabilistic monitoring network would not only destroy the integrity of the program, but also severely disrupt personnel schedules and work activities. For the reasons discussed above, the basic design of the Arkansas monitoring network should not be changed.

The weakest part of Arkansas's 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 fisheries designated 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 using only chemical concentrations. In contrast, other designated uses, e.g., drinking water supply, primary contact recreation, etc., must rely on analyses of water samples directly.

To address this issue, site-specific intensive surveys are conducted to better assess the biological integrity of streams. Data from the water quality monitoring networks are used to identify areas of potential aquatic life impairment. Intensive survey work, including biological assessments, is performed on these designated areas. Examples of such surveys are the implementation of the "Aquatic Life Use Attainment Determination of Selected Category 5F Waters Listed on the 2008 List of Impaired Water Bodies" and "Fish Community Sampling of Ecoregion Reference Streams, 2008".

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This assessment methodology considers the Environmental Protection Agency's (EPA) most current 305(b) reporting and 303(d) listing requirements and guidance following the percent method. In addition, the Arkansas Department of Environmental Quality follows the specific requirements of 40 CFR. § 130.7 - 130.8. The criteria within this assessment methodology are utilized to make decisions about attainment of water quality standards of a given waterbody or waterbody segment. Monitoring data will be assessed based upon the frequency, duration, and/or magnitude of water quality standard exceedances.

A biennial report on the condition of the state's waters is prepared by ADEQ in accordance with the "Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act, July 29, 2005," and subsequent updates. Waters are evaluated in terms of whether their assigned water quality standards, as delineated in the Arkansas Pollution Control and Ecology Commission's Regulation No. 2, are being attained.

The primary data used in the evaluations are generated as part of ADEQ's water quality monitoring activities described in the "State of Arkansas's Water Quality Monitoring and Assessment Program." In addition, pursuant to 40 CFR § 130.7(b)(5), ADEQ assembles and evaluates all existing and readily available water quality data and information.

State and federal agencies and other entities that collect water quality data are solicited to aid ADEQ in its evaluation of the State's waters. All data submitted to ADEQ will be considered. However, the data must:

- represent actual annual ambient conditions, as described below;
- have been collected and analyzed under a quality-assurance/quality-control protocol equivalent to or more stringent than that of ADEQ or the USGS;
- have been analyzed pursuant to the rules outlined in the State Environmental Laboratory Certification Program Act, Ark, Code Ann. § 8-2-201 et seg;
- be reported in standard units recommended in the relevant approved method;
- be accompanied by precise sample site location(s) data, preferably latitude and longitude in either decimal degrees or degrees, minutes, seconds;
- be received in either an Excel spreadsheet or compatible format; and
- have been collected within the period of record.

The dataset must be spatially and temporally representative of the actual annual ambient conditions of the waterbody. Sample locations in streams and open waterbodies should be characteristic of the main water mass or distinct hydrologic areas. At a minimum, samples should be distributed over at least three seasons (to include inter-seasonal variation) and over two years (to include inter-year variation) to be utilized. The dataset should not be biased toward specific conditions, such as flow, runoff, or season. No more than two-thirds of the samples should be in one year or one season. The exception to this is the analysis of data for those designated uses that require seasonally based water quality data; i.e. primary contact recreation, biological community data, critical season dissolved oxygen.

PERIOD OF RECORD:

Metals and ammonia toxicity analysis - *April 1, 2008 to March 31, 2011*

All other analyses - *April 1, 2006 to March 31, 2011*

Data developed prior to the period of record should only be used for long-term trend analysis because the data would have been evaluated as part of a previous assessment. Data developed after the period of record, including but not limited to water quality data, the completion of surveys (including the completion of the final report), revisions in water quality standards, and the completion of total maximum daily loads, will be considered during the next assessment period.

Assessment

Routine water quality data collection generally follows a monthly or bimonthly sampling regime, producing 12 to 60 data points over a five-year period. Therefore, a minimum of 12 water quality samples is required for water quality standards attainment decisions, unless otherwise established by Regulation No. 2 or elsewhere in this assessment methodology.

For the assessment of waterbodies where no new data have been generated, the previous assessment decisions will be carried forward. However, if a substantial change in the water quality standards or the assessment methodology has occurred, and those changes would affect the previous assessment decisions, the waterbody will be re-assessed utilizing the dataset from the previous assessment.

The percent exceedances shown in the Assessment Criteria Tables are calculated using the total number of samples collected. The number of data points exceeding the criteria that are necessary for an assessment decision will be calculated and rounded up to the nearest whole number; e.g., 25% of 38 data points = 9.5, therefore ten (10) exceedances is the criteria.

An evaluated assessment of attainment of water quality standards, in the absence of data, can be made for contiguous stream segments to monitored waters if there is reason to believe that the segments are similar with respect to the watershed characteristics and watershed conditions. Otherwise, the contiguous stream segments will remain unassessed.

An evaluated assessment of non-attainment can be made for contiguous stream segments to monitored waters if there is reason to believe that the segments are similar with respect to the potential cause and magnitude of impairment. However, an evaluation of non-attainment cannot be made for contiguous stream segments to monitored waters when the source or the origin of the source of the impairment is unknown, and/or when the magnitude or frequency of the impairment is such that contiguous segments may not be affected. In addition, an evaluation of non-attainment cannot be made for contiguous stream segments to monitored waters when a tributary enters the water body either upstream or downstream of the monitored segment. In such cases, the contiguous stream segments will remain unassessed.

Water quality standards, assessment criteria, and monitoring strategies are currently being developed for the State's lakes. Once these items have been adopted into Regulation No. 2 and compiled into the State's overall monitoring strategy plan, an assessment methodology can be developed that will address lake water quality standards. Until this has been accomplished, only those water quality standards currently listed in Regulation No. 2 can be assessed. In addition, there has not been a significant quantity of data recently collected from any of the State's lakes, except for a very limited amount of data collected from lakes associated with reference lake projects.

The possibility of naturally occurring disruptions that may cause exceedances of a standard, but do not result in designated use impairment, must be considered. Exceedances resulting from Naturally Occurring Excursions (NOE), or determined to be Natural Background conditions, as defined in Reg. 2.106, will not be assessed as impaired. These determinations will be made on a case-by-case basis which will usually involve performing an intensive survey of the waterbody segment as outlined in the most current version of "State of Arkansas Water Quality Monitoring and Assessment Program."

Narrative Criteria - Waters will be assessed as Anon-support@ when a violation of any narrative water quality standard has been verified by ADEQ. This will be accomplished by the use of scientific study reports that document an impairment is caused by the exceedance of a narrative criterion. The validity of the report must have been verified by ADEQ. In addition, waters will be assessed as "non-support" if any associated numeric standard of a narrative criterion is violated pursuant to this assessment methodology.

Numeric Criteria - All waters of the State with qualifying data will be assessed as either "support" or "non-support" based on the assessment of numeric criteria outlined below.

Impairment Source Determination

For any waterbody segment where a water quality standard has been evaluated as not supported, the source(s) of impairment will be identified using available information (field observation, land use maps, point source location, nonpoint source assessment reports, special studies, and knowledge of field personnel familiar with the waterbody) and best professional judgment.

Listing Categories

The State's waterbodies are segmented based on the NHD dataset. Stream reaches that are assessed as not attaining water quality standard(s) will be listed and categorized based on the confidence level, quality assurance, and quantity of the data, and EPA guidance. Arkansas's List of Water Quality Limited Water Bodies has been formatted to reflect the most current EPA guidance which suggests placing waterbody segments into five categories. Category 5 is further subdivided by the Department for planning and management purposes.

1 = Attaining all water quality standards;
2 = Attaining some water quality standards, but there are insufficient data to determine if other standards are being attained;
3 = Insufficient data to determine if any water quality standards are attained;

- No data available;
- The data do not meet the spatial and/or temporal requirements outlined in this assessment methodology;
- Waters in which the data are questionable because of QA/QC procedures and those requiring confirmation of impairment before a TMDL is scheduled.

4 = One or more water quality standards not attained but does not require the development of a TMDL because:

a. A TMDL has been completed for the listed parameter(s);
b. Waters which are impaired by point source discharges and future permits restrictions are expected to correct the problem(s).
c. Waters that currently do not meet an applicable water quality standard, but the impairment is not caused by a pollutant.

5 = The waterbody may be impaired, or one or more water quality standards may not be attained. Water Bodies in Category 5 will be prioritized in the following manner:

a. High
   - Truly impaired; develop a TMDL or other corrective action(s) for the listed parameter(s).
b. Medium
   - Waters currently not attaining standards, but may be de-listed with future revisions to Regulation No. 2, the State water quality standards; or
   - Waters which are impaired by point source discharges and future permit restrictions are expected to correct the problem(s).
c. Low
   - Waters currently not attaining one or more water quality standards, but all designated uses are determined to be supported; or
   - There are insufficient data to make a scientifically defensible decision concerning designated use attainment; or
   - Waters the Department assessed as unimpaired, but were added to the list by EPA.

Designated Uses

The following parameters are most often associated with impacts of designated uses:

Table III-2: Designated Use Parameters

Designated Use	Parameters
Fisheries	DO, pH, temp., turbidity/TSS, toxics, ammonia or any nontoxic compound which alters the aquatic life community structure beyond that explained in Reg. 2.405.
Domestic Water Supply	Compounds which are not easily removed by drinking water treatment facilities; compounds with established secondary maximum contaminant levels, e.g., Cl, SO_4, TDS, NO_3
Primary and Secondary Contact	*Escherichia coli*, fecal coliform
Agriculture or Industrial Water Supply	Compounds 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

Antidegradation

In compliance with the antidegradation policy, a Tier 3 waterbody (e.g. Extraordinary Resource Waters, Ecologically Sensitive Waters, Natural and Scenic Waterways) will be listed as "non-support" if the water quality that existed at the time of designation has declined. For all other waters (Tier 1 and Tier 2) the listing requirements discussed above will apply.

Assessment Criteria

The following are ecoregion or stream segment-specific assessment criteria that are used to evaluate waterbody water quality standards attainment. These criteria were developed using Arkansas's water quality standards, EPA guidance documents, and historical surveys.

Arkansas bases its water quality assessments on the ability of a waterbody to support the State's water quality standards. Two decisions are employed – "Supporting" and "Not Supporting." A waterbody is assessed as "Supporting" if the waterbody meets all assessment criteria for which data are available. A waterbody will be assessed as "Not-Supporting" if any assessment criterion is not attained.

As noted in the Assessment Criteria Tables (Table III-5), constituents such as dissolved oxygen (DO), temperature, minerals, etc. may be footnoted with a "[1]" indicating that site specific standards may exist for certain waterbodies within that ecoregion.

General Standards

Reg. 2.405 - Biological Integrity

The Fisheries designated use (aquatic life) will be evaluated based on the biological integrity (macroinvertebrate and/or fish communities) of the waterbody, if biological data exist to make an evaluation. At a minimum, the data must have been collected over two seasons using methods outlined in a quality assurance project plan with requirements equal to or more stringent than that of the Department's. The following tables outline the evaluation protocol and the listing protocol for biological integrity support determinations.

Table III-3: Biological Integrity Evaluation Protocol

<table>
<tr><th>Indicator</th><th>Data Type</th><th>Supporting</th><th>Not Supporting</th></tr>
<tr><td rowspan="2">Macroinvertebrate Community</td><td rowspan="2">Macroinvertebrate Community Data Available</td><td colspan="2">Until MBMI* is developed and critiqued, an upstream/downstream comparison of communities will be utilized, or the community data will be compared to historical ecoregion data using: total taxa richness, EPT, and % dominant taxa. As these metrics are indicative of perturbation/degradation.</td></tr>
<tr><td>Hilsenhoff Biotic Index (HBI), Ephemeroptera/Plecoptera/Trichoptera (EPT), and taxa richness indices are highly, generally, or fairly similar to comparison site.</td><td>HBI, EPT, and taxa richness indices are not similar to comparison site.**</td></tr>
<tr><td>Fish Community</td><td>Fish Community Data Available</td><td>Ichthyofaunal Biological Index (IBI) score either highly, generally, or fairly similar; general presence of sensitive and indicator species.</td><td>IBI score not similar; absence of sensitive and indicator species.**</td></tr>
</table>

* Macroinvertebrate Biological Monitoring Index

** The aquatic life will be assessed as fully supporting if the low IBI score is caused by an abnormal occurrence in the aquatic life community, not an environmental factor (low dissolved oxygen, low pH, toxicity).

Evaluation methods for the determination of similarity as referenced in the table above are those outlined in Arkansas's Water Quality and Compliance Monitoring Quality Assurance Project Plan, May 2009 (QTRAK #07-350).

Table III-4: Fisheries Designated Use Listing Protocols

Type of Data Present	Evaluation Result		Final Assessment	303 (d) Listing Category
	Fish Community	**Macroinvertebrate Community**		
Fish Community, Macroinvertebrate Community	S	S	FS	1
	S	NS	NS	5
	NS	S	NS	5
	NS	NS	NS	5
At Least One Biological Community	S	S	FS	1
	NA	S	FS	1
	S	NA	FS	1
	NA	NA	NA	3
	NS	NA	NS	5
	NA	NS	NS	5
Fish Community and/or Macroinvertebrate Community	S	S	FS	1
	S	NS	NS	5
	NS	S	NS	5
	NS	NS	NS	5

S = Supporting NS = Not Supporting FS = Fully Supporting NA = None Available

Reg. 2.502 - Temperature

If more than 10 percent of the total samples from a site exceed the water temperature standard, as listed in the following tables, because of a discernible man-induced cause, the waterbody will be listed as not attaining the temperature standard. However, if the water temperature standard is exceeded due to a natural condition, excessively high ambient temperatures, drought, etc., the waterbody will not be listed as impaired.

Table III-5: Assessment Criteria Tables

ASSESSMENT CRITERIA FOR OZARK HIGHLANDS ECOREGION STREAMS

PARAMETER	**STANDARD**		**SUPPORT**		**NON-SUPPORT**	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	29 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi^2	6	2	< 5 samples or < = 10%		>10%	
10-100 mi^2	6	5	< 5 samples or < = 10%		>10%	
> 100 mi^2	6	6	< 5 samples or < = 10%		>10%	
Trout Waters	6	6	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
TURBIDITY						
Base Flows	10 NTU		< = 25%		>25%	
All Flows	17 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR BOSTON MOUNTAINS ECOREGION STREAMS

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	31 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi^2	6	2	< 5 samples or < = 10%		>10%	
> 10 mi^2	6	6	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
TURBIDITY						
Base Flows	10 NTU		< = 25%		>25%	
All Flows	19 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR ARKANSAS RIVER VALLEY ECOREGION STREAMS

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	31 C		< =10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi^2	5	2	< 5 samples or < = 10%		>10%	
10-150 mi^2	5	3	< 5 samples or < = 10%		>10%	
151-400 mi^2	5	4	< 5 samples or < = 10%		>10%	
>400 mi^2	5	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
TURBIDITY						
Base Flows	21 NTU		< = 25%		>25%	
All Flows	40 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR OUACHITA MOUNTAINS ECOREGION STREAMS

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	30 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi^2	6	2	< 5 samples or < = 10%		>10%	
>10 mi^2	6	6	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
TURBIDITY						
Base Flows	10 NTU		< = 25%		>25%	
All Flows	18 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR GULF COASTAL ECOREGION (typical streams)

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	30 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi^2	5	2	< 5 samples or < = 10%		>10%	
10-500 mi^2	5	3	< 5 samples or < = 10%		>10%	
>500 mi^2	5	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
TURBIDITY						
Base Flows	21 NTU		< = 25%		>25%	
All Flows	32 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR GULF COASTAL ECOREGION (spring water influenced)

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	30 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
ALL WATERSHEDS	6	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
TURBIDITY						
Base Flows	21 NTU		< = 25%		>25%	
All Flows	32 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR DELTA ECOREGION (least altered)

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	30 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi^2	5	2	< 5 samples or < = 10%		>10%	
10-100 mi^2	5	3	< 5 samples or < = 10%		>10%	
>100 mi^2	5	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
TURBIDITY						
Base Flows	45 NTU		< = 25%		>25%	
All Flows	84 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR DELTA ECOREGION (channel-altered)

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	32 C		< =10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi^2	5	2	< 5 samples or < = 10%		>10%	
10-100 mi^2	5	3	< 5 samples or < = 10%		>10%	
>100 mi^2	5	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
TURBIDITY						
Base Flows	75 NTU		< = 25%		>25%	
All Flows	250 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR WHITE RIVER (MAIN STEM)

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]						
DAM #1 TO MOUTH	32 C		< =10%		>10%	
OZARK HIGHLANDS	29 C		< = 10%		>10%	
TROUT WATERS	20 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
DELTA	5	5	< 5 samples or < = 10%		>10%	
OZARK HIGHLANDS	6	6	< 5 samples or < = 10%		>10%	
TROUT WATERS	6	6	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
$CL/SO_4/TDS$[1]						
Mouth to Dam #3	20/60/430		< =10%		>10%	
DAM #3 TO MO. LINE[1]	20/20/180		< =10%		>10%	
MO. LINE TO HEADWATERS[1]	20/20/160		< =10%		>10%	
TURBIDITY						
Base Flows - Delta	45 NTU		< = 25%		>25%	
All Flows - Delta	84 NTU		< = 20%		>20%	
Base Flows - Ozark Highlands	10 NTU		< = 25%		>25%	
All Flows - Ozark Highlands	17 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR ST. FRANCIS RIVER

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	32 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
ALL WATERS	5	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
CL/SO_4/TDS[1]						
MOUTH TO 36^0 N. LAT.[1]	10/30/330		< =10%		>10%	
36^0 N. LAT. TO 36^0 30'N LAT.[1]	10/20/180		< =10%		>10%	
TURBIDITY						
Base Flows	75 NTU		< = 25%		>25%	
All Flows	100 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR THE ARKANSAS RIVER

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	32 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
ALL WATERS	5	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
CL/SO_4/TDS[1]						
MOUTH TO L&D #7[1]	250/100/500		< =10%		>10%	
L&D #7 TO L&D #10[1]	250/100/500		< =10%		>10%	
L&D #10 TO OK LINE[1]	250/120/500		< =10%		>10%	
TURBIDITY						
Base Flows	50 NTU		< = 25%		>25%	
All Flows	52 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR THE OUACHITA RIVER

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]						
L. MISSOURI TO S.LINE	32 C		< = 10%		>10%	
ABOVE L. MISSOURI	30 C		< =10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
ALL WATERS	5	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
$CL/SO_4/TDS$[1]						
LA LINE TO CAMDEN[1]	160/40/350		< =10%		>10%	
CAMDEN TO CARPENTER DAM[1]	50/40/150		< =10%		>10%	
CARPENTER DAM TO HEADWATERS[1]	10/10/100		< =10%		>10%	
TURBIDITY						
Base Flows	21 NTU		< = 25%		>25%	
All Flows	32 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR THE RED RIVER

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	32 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
ALL WATERS	5	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
$CL/SO_4/TDS$[1]						
OK LINE TO CONFLUENCE WITH LITTLE RIVER[1]	250/200/850		< =10%		>10%	
LITTLE RIVER TO LA LINE[1]	250/200/500		< =10%		>10%	
TURBIDITY						
Base Flows	50 NTU		< = 25%		>25%	
All Flows	150 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR THE MISSISSIPPI RIVER

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE[1]	32 C		< = 10%		>10%	
DISSOLVED OXYGEN[1] (mg/L)	Primary	Critical	Primary	Critical	Primary	Critical
ALL WATERS	5	5	< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
CL/SO_4/TDS[1]						
LA LINE TO AR RIVER[1]	60/150/425		< =10%		>10%	
AR RIVER TO MO LINE[1]	60/175/450		< =10%		>10%	
TURBIDITY						
Base Flows	50 NTU		< = 25%		>25%	
All Flows	75 NTU		< = 20%		>20%	

ASSESSMENT CRITERIA FOR LAKES

PARAMETER	STANDARD	SUPPORT	NON-SUPPORT
		DATA POINTS EXCEEDING CRITERIA	
TEMPERATURE[1]	32 C	< = 10%	>10%
DISSOLVED OXYGEN[1] (mg/L)	5	< 5 samples or < = 10%	>10%
pH	6 to 9 standard pH units	< =10%	>10%
CL/SO_4/TDS[1]	205/205/500	< =10%	>10%
TURBIDITY			
Base Flows	25 NTU	< = 25%	>25%
All Flows	45 NTU	< = 20%	>20%

Specific Standards

Reg. 2.503 - Turbidity

Turbidity, Reg. 2.503, will be evaluated for both base and all flows. If a waterbody is not meeting either of these conditions, it will be listed as not supporting the turbidity criteria.

Base flow values represent the critical season, June 1 to October 31, when rainfall is infrequent. If four or more samples, or more than 25 percent of the total samples, whichever is greater, collected between June 1 and October 31 for the period of record exceed the base flows values, the stream segment will be listed as not attaining the turbidity standard.

All flows assessment takes into account samples collected throughout the year. If more than 20 percent of the total samples (not to be less than 24) collected from the Ambient Water Quality Monitoring Network (AWQMN) sites exceed the all flows values, the waterbody will be listed as not attaining the turbidity standard. For data collected from sites other than the AWQMN, if five or more samples, or more than 20 percent of the total samples, whichever is greater, exceed the all flows values, the waterbody will be listed as not attaining the turbidity standard.

Reg. 2.504 - pH

If greater than 10 percent of the samples collected exceed the pH standards due to a waste discharge, the waterbody will be listed as not attaining the pH standard.

Reg. 2.505 - Dissolved Oxygen

Dissolved oxygen standards are divided into two categories: primary season when water temperatures are at or below 22°C; and critical season when water temperatures exceed 22°C. If five or more samples, or greater than 10 percent of the total samples collected, whichever is greater, fail to meet the minimum dissolved oxygen standard, the waterbody will be listed as not attaining the dissolved oxygen standard.

Reg. 2.504 - Radioactivity

For the assessment of ambient waters for radioactivity, at no time shall the concentration of radium-226 exceed 3 picocuries/Liter nor shall the concentration of strontium-90 exceed 10 picocuries/Liter. If qualifying data indicate an exceedance of either of these parameters, the waterbody will be listed as impaired.

Reg. 2.507 - Bacteria

For assessment of ambient waters, contact recreation designated uses will be evaluated using *Escherichia coli* as outlined in Reg. 2.507. In the absence of *E. coli* bacteria data, fecal coliform bacteria data will be utilized as outlined in Reg. 2.507. In either case, a minimum of eight (8) samples, all of which must be collected and equally spaced within one contact recreation season (May through September or October through April of contiguous months) to make an evaluation of non-attainment. However, a minimum of six (6) samples, all of which must meet the criteria, may be used to make an evaluation of attainment. The geometric mean will be calculated on a minimum of five (5) samples equally spaced over a 30-day period.

In either case, if either the single sample criterion or the geometric mean is exceeded for the period of record, the waterbody will be listed as impaired. Datasets of less than those described above will be evaluated if they represent actual seasonal or annual ambient conditions as discussed earlier. Listings prior to 2004 may have identified water bodies as water quality impaired using fecal coliform data. These listings were, and will be retained unless additional data for *E. coli* become available. If data show the current *E. coli* criteria are met, the waterbody will be de-listed.

Table III-6: Statewide Bacteria Assessment Criteria

Escherichia coli		STANDARD	SUPPORT	NON-SUPPORT
PRIM. CONTACT	ERW, ESW, and NSW Waters Lakes, Reservoirs	298 col/100 ml (May-Sept)	< = 25%	>25%
		GM 126 col/100 ml	< = standard	> standard
	All other waters	410 col/100 ml (May-Sept)	< = 25%	>25%
SEC. CONTACT	ERW, ESW, and NSW Waters Lakes, Reservoirs	1490 col/100 ml(anytime)	< = 25%	>25%
		GM 630 col/100 ml	< = standard	> standard
	All other waters	2050 col/100 ml(anytime)	< = 25%	>25%
Fecal Coliform		STANDARD	SUPPORT	NON-SUPPORT
PRIMARY CONTACT All Waters including ERW, ESW, NSW, Lakes, and Reservoirs		400 col/100 ml (May-Sept)	< = 25%	>25%
		GM 200 col/100 ml	< = standard	> standard
SECONDARY CONTACT All Waters including ERW, ESW, NSW, Lakes, and Reservoirs		2000 col/100 ml(anytime)	< = 25%	>25%
		GM 1000 col/100 ml	< = standard	> standard

ERW – Extraordinary Resource Waters NSW – Natural and Scenic Waterways
ESW – Ecologically Sensitive Waterbody

Reg. 2.508 - Metals

In accordance with Reg. 2.508, metals toxicity will be evaluated based on instream hardness values at the time of sample collection. If the ambient hardness value is less than 25 mg/L, then a hardness value of 25 mg/L will be used to calculate metals toxicity. If more than one exceedance of the criterion occurs during the period of record, the waterbody will be listed as impaired for that criterion.

Table III-7: Statewide Metals Assessment Criteria

	Acute	Chronic
Support	< =1	< =1
Non-Support	>1	>1

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

Table III-8: Statewide Fish Consumption Assessment Criteria

Support	No restriction or limited consumption
Non-Support	No consumption for any user group

Reg. 2.511 - Mineral Quality

Mineral quality will be evaluated as follows: assessments for water bodies with site specific criteria are made according to the specific values listed in Reg. 2.511(A). For those water bodies without site specific criteria, and those stream segments that receive waste water effluent, the criteria of 250 mg/L of chlorides, 250 mg/L of sulfates, and 500 mg/L of total dissolved solids will apply. In either case, if greater than 10 percent of the total samples for the period of record exceed the applicable criteria, the waterbody will be included on the 303(d) list as being impaired for the mineral(s) assessed.

Table III-9: Statewide Minerals Assessment Criteria

Parameter	Standard	Support	Non-Support
Site Specific Standards (mg/L)	See Reg. 2.511(A)	< =10%	>10%
$CL/SO_4/TDS$[1]	250/250/500	< =10%	>10%

The Calculated Ecoregion Reference Stream Values (mg/L) listed in Reg. 2.511(B) are used to determine whether there is a 'significant modification of the water quality.' These values are not intended to be used to evaluate designated use attainment. Any discharge that results in instream chlorides, sulfates, and or total dissolved solids concentrations greater than the calculated values listed below and greater than 10 percent of the time will be considered to be a significant modification of the water quality and the process outlined in Reg. 2.306 should be implemented.

Table III-10: Calculated Ecoregion Reference Stream Values (mg/L)

Ecoregion	Chlorides	Sulfates	TDS
Ozark Highlands	17.3	22.7	250
Boston Mountains	17.3	15	95.3
Arkansas River Valley	15	17.3	112.3
Ouachita Mountains	15	20	142
Gulf Coastal Plains	18.7	41.3	138
Delta	48	37.3	411.3

Domestic, Agricultural, and Industrial Water Supply

For assessment of ambient waters, the domestic, agricultural, and industrial water supply designated uses will be evaluated using (Reg. 2.511) chloride, sulfate, and total dissolved solids in accordance with the Federal Safe Drinking Water Act. If greater than 10 percent of the total samples for the period of record exceed the criteria, the waterbody will be listed as impaired.

Table III-11: Statewide Water Supply Assessment Criteria

PARAMETER	STANDARD	SUPPORT	NON-SUPPORT
$CL/SO_4/TDS$[1]	250/250/500	< =10%	>10%

Reg. 2.512 - Ammonia

Total ammonia nitrogen will be evaluated using Reg. 2.512A - D based on instream pH and temperature, as applicable, at the time of sample collection.

If more than one violation of the one-hour average concentration of total ammonia nitrogen exceeds the calculated Acute Criterion; or

If more than one violation of the thirty-day average concentration of total ammonia nitrogen exceeds the Chronic Criterion; or

If more than one violation of the four-day average within a 30-day period exceeds 2.5 times the Chronic Criterion value, the waterbody will be listed as not attaining ammonia toxicity standards.

Table III-12: Statewide Total Ammonia Nitrogen Assessment Criteria

	ONE-HOUR AVERAGE	THIRTY-DAY AVERAGE	4-DAY AVERAGE
Support	< =1 in 3 years	< =1 in 3 years	< =1 in 3 years
Non-Support	>1 in 3 years	>1 in 3 years	>1 in 3 years

Chemical Parameters

The following tables summarize the use support of the Category 4 and Category 5 303(d) listings of the State's river and stream water bodies. A detailed listing of each segment-specific waterbody, a designated use and a water quality standards attainment assessment, and other segment specific data are located Appendix A.

***Table III-13*: Designated Use & Water Quality Standards Support in Arkansas**

Degree of Use Support	Assessed Total (miles)
Supporting all assessed uses	6168.7
Not supporting a use	3661.2
Total Waters Assessed	9829.9

***Table III-14*: Designated Use Support of Assessed Waters by Use Type**

Use Type	Support (miles)	Non-Support (miles)
Fish consumption	9487.0	342.9
Fisheries	7401.8	2428.1
Primary contact	9613.9	216.3
Secondary contact	9829.9	0
Domestic Water Supply	9737.4	92.5
Agri & Industrial Water Supply	9515.5	314.4

Table III-15: Total Sizes of Waters Listed Not Supporting Water Quality Standards or Designated Uses by Various Source Categories

Source Categories	Stream Segments	Stream Miles
Agriculture	49	1084.5
Industrial point sources	17	224
Municipal point sources	17	195.3
Resource extraction	20	223.7
Surface erosion	43	669.5
Urban run-off	4	27.6
Silviculture	0	0.0
Hydropower	3	9.2
Unknown	105	2051.2

Table III-16: Total Sizes of Waters Listed Not Attaining Water Quality Standards by Various Cause Categories

Cause Categories	Stream Segments	Stream Miles
Ammonia	2	11.5
Nitrogen	9	95.7
Phosphorus	5	47.5
Chlorides	29	761.8
Sulfates	36	561.0
Total Dissolved Solids	56	967.4
Siltation/Turbidity	85	1549
Pathogen Indicators	18	319
Cadmium	1	2.5
Copper	22	379.1
Lead	33	517
Zinc	22	305.6
Mercury	23	318.5
Priority Organics	1	44.8
Dissolved Oxygen	43	807.6
pH	19	233.1
Temperature	5	22.8

Biological Parameters

Fisheries designated use assessment is a tool used to better characterize the health of the aquatic biota based on macroinvertebrate and fish community structures. Short-term water quality impairments either from point and/or nonpoint source inputs or from short-term seasonal and/or storm events may not be detected using 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. Therefore, biological data, when available, will be the ultimate deciding factor of the attainment of the Fisheries designated use, regardless of chemical conditions.

Between April 1, 2006 and March 31, 2011, nearly 300 aquatic biota samples were collected for the purpose of watershed assessment surveys or the establishment of ecoregion based indices of biotic integrity, as well as use support determination. Some of these samples were part of the special project surveys listed in Part III, Chapter 1. The data are accessible online: www.adeq.state.ar.us/compsvs/webmaster/databases.htm.

Table III-17: Recent Aquatic Life Data Collections

Upper Saline Watershed Nutrient Criteria Development and MBMI Pilot Project (2006-2010)						
Site Name	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrates Collected**	**Fish Community Collected**
AF-1 (Alum Fork)	8040203	-014	2C	Ouachita Mountains	X	
AFS0001 (Alum Fork)	8040203	-014	2C	Ouachita Mountains	X	
Alum Fork at Hwy 229	8040203	-012	2C	Ouachita Mountains	X	
Alum Fork at Sulphur Spgs Rd.	8040203	-014	2C	Ouachita Mountains	X	
Alum Fork near Alum View Rd	8040203	-014	2C	Ouachita Mountains	X	
Bread Creek	8040203	-223	2C	Ouachita Mountains	X	
Cedar Creek at Hwy 5	8040203	-021	2C	Ouachita Mountains	X	
LAF01 (Little Alum Fork)	8040203	-261	2C	Ouachita Mountains	X	X
Lee Creek at Unity	8040203	-252	2C	Ouachita Mountains	X	
MFS01 (Middle Fork Saline)	8040203	-019	2C	Ouachita Mountains	X	X
MFS06 (Middle Fork Saline)	8040203	-019	2C	Ouachita Mountains	X	
NF-2	8040203	-011	2C	Ouachita Mountains	X	
NF-4	8040203	-011	2C	Ouachita Mountains	X	
NF-5 (North Fork Saline)	8040203	-011	2C	Ouachita Mountains	X	
NF6-A (North Fork Saline)	8040203	-011	2C	Ouachita Mountains	X	
NF6-B (North Fork Saline)	8040203	-011	2C	Ouachita Mountains	X	
NFS01 (North Fork Saline)	8040203	-011	2C	Ouachita Mountains	X	X
SFS02 (South Fork Saline)	8040203	-020	2C	Ouachita Mountains	X	X
South Fork Saline at Hwy 5	8040203	-020	2C	Ouachita Mountains	X	X
Stillhouse Creek	8040203	-547	2C	Ouachita Mountains	X	
Ten Mile Creek at Hwy 70	8040203	-717	2C	Ouachita Mountains	X	
Williams Creek at Hwy 5	8040203	-285	2C	Ouachita Mountains	X	

Table III-17 (cont.): Recent Aquatic Life Data Collections

Cove Creek Physical, Chemical, and Biological Community Assessment (2007)						
Site Name	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrates Collected**	**Fish Community Collected**
OUA0101	8040102	-500	2F	Ouachita Mountains	X	
OUA0104	8040102	-500	2F	Ouachita Mountains	X	
OUA0103	8040102	-147	2F	Ouachita Mountains	X	
OUA0100	8040102	-143	2F	Ouachita Mountains	X	
OUA0159	8040102	-142	2F	Ouachita Mountains	X	
OUA0171D	8040102	-505	2F	Ouachita Mountains	X	
OUA0171C	8040102	-001	2F	Ouachita Mountains	X	
OUA0171B	8040102	-501	2F	Ouachita Mountains	X	

Table III-17 (cont.): Recent Aquatic Life Data Collections

Inventory of Biotic Assemblages for Cedar, Cove, Lee, and Webber Creeks (2009-2010)						
Site Name	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrates Collected**	**Fish Community Collected**
Cedar Creek at Hwy 248	11110104	-019	3H	Boston Mountains	X	X
Cove Creek at Creek Ford Rd	11110104	-010	3H	Boston Mountains	X	X
Lee Creek at Hwy 220	11110104	-006	3H	Boston Mountains	X	X
Lee Creek at Independence Rd	11110104	-005	3H	Boston Mountains	X	X
Webber Creek at Goines Rd	11110104	-019	3H	Boston Mountains	X	X

Table III-17 (cont.): Recent Aquatic Life Data Collections

Assessment of Ecoregion Reference Streams (2009-2010)						
Site Name	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrates Collected**	**Fish Community Collected**
Indian Creek	11110202	-020	3H	Boston Mountains		X
Hurricane Creek	11110202	-022	3H	Boston Mountains		X
Illinois Bayou	11110202	-011	3H	Boston Mountains		X
Lee Creek	11110104	-005	3H	Boston Mountains		X
Mulberry River	11110201	-006	3H	Boston Mountains		X
South Fork Spavinaw Creek	11070209	-048t	3J	Ozark Highlands		X
Flint Creek	11110103	-031	3J	Ozark Highlands		X
Long Creek	11010001	-054	4K	Ozark Highlands		X
Yocum Creek	11010001	-052	4K	Ozark Highlands		X
War Eagle Creek	11010001	-034	4K	Ozark Highlands		X
Kings River	11010001	-037	4K	Ozark Highlands		X
Diles Creek	11010011	-399	4H	Ozark Highlands		X
Weldon Creek	11010010	-550	4H	Ozark Highlands		X
West Livingston Creek	11010004	-1150	4F	Boston Mountains		X
Piney Creek	11010004	-009	4F	Ozark Highlands		X
Strawberry River	11010012	-011	4G	Ozark Highlands		X
Rock Creek	11010012	-469	4G	Ozark Highlands		X

Table III-17 (cont.): Recent Aquatic Life Data Collections

Aquatic Life Use Attainment Determination of Selected Category 5F Waters Listed on the 2008 List of Impaired Waterbodies (2009-2011)							
Site Name	**Station ID**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrates Collected**	**Fish Community Collected**
Mulberry River	ARK0138	11110201	-009	3H	Boston Mountains	X	X
Black River at Corning	WHI0003	11010007	-002	4G	Delta	X	X
Black River at Pocahontas	WHI0025	11010007	-005	4G	Delta	X	X
Current River	WHI0004	11010008	-001	4H	Delta	X	X
Eleven Point River	WHI0005B	11010010	-001	4H	Delta	X	X
Fourche River	WHI0170	11010010	-008	4G	Delta	X	X
Janes Creek	UWJNC01	11010010	-002	4H	Ozark Highlands	X	X
Martins Creek	UWMTC01	11010010	-004	4H	Ozark Highlands	X	X
Myatt Creek	WHI0171	11010010	-010	4H	Ozark Highlands	X	X
Spring River at Hardy	WHI0022	11010010	-003	4H	Ozark Highlands	X	X
Spring River at Ravenden	WHI0021	11010010	-006	4H	Ozark Highlands	X	X
South Fork Spring	WHI0023	11010010	-012	4H	Ozark Highlands	X	X
Warm Fork Spring River	WHI006A	11010010	-008t	4H	Ozark Highlands	X	X
Buffalo River at St. Joe	WHI0049A	11010005	-001	4J	Ozark Highlands	X	X
Buffalo River at confluence	BUFR09	11010005	-005	4J	Ozark Highlands	X	X

Table III-17 (cont.): Recent Aquatic Life Data Collections

Physical, Chemical, Biological Assessment of Town Branch, Little Sugar, and McKissic Creeks (2009-2010)							
Site Name	**Station ID**	**H.U.C.**	**Reach**	**Planning Segment**	**Ecoregion**	**Macro-Invertebrates Collected**	**Fish Community Collected**
Town Branch	ARK0056	11070208	-903	3J	Ozark Highlands	X	X
Little Sugar	UWLSC01	11070208	-035	3J	Ozark Highlands	X	X
Little Sugar	ARK0001	11070208	-003	3J	Ozark Highlands	X	X
McKissic	UWMKC01	11070208	-116	3J	Ozark Highlands	X	X

Percent comparability evaluation techniques were used in the evaluation of the macroinvertebrate and fish communities. Two types of community comparisons were made: upstream-downstream community comparison and least disturbed reference stream comparison.

The macroinvertebrate communities were collected and evaluated following the Department's Rapid Bioassessment Protocols.

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's Ecoregions, 1987."

Background

Although selected lakes have had intensive, long-term assessments, the water quality data from the majority of Arkansas's lakes are sparse. Some have only specific purpose data, e.g., bacteria 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's 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 dataset ranges from pre-impoundment to the present.

Arkansas currently has identified 79 significant publicly-owned lakes (Figure III-3) ranging in size from 60 to over 45,000 acres; totaling 357,896 acres. The lakes are categorized into five "Types" (ADEQ 2004) by ecoregion, primary construction purpose, and certain morphometric features such as size and average depth (Table III-18). In 2007, construction was completed on the Lake Fort Smith dam in Crawford County in northwest Arkansas which combined Lake Shepherd Springs and the original Lake Fort Smith. The new Lake Fort Smith is 1390 surface acres, 422 surface acres larger than the original two lakes combined.

Lake Water Quality Assessments

Since 1989, four lake water quality assessments have been completed on Arkansas's significant publicly-owned lakes. Water quality samples, metals, pesticides, and pathogens, as well as dissolved oxygen and temperature profiles were collected from most of these lakes between mid-July and the end of August in 1989, 1994, 1999, and 2004. Sediment samples were collected in 1994 and plankton samples were collected in 1999 and 2004.

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 of 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.

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 Plains 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. In this group, runoff from watersheds that discharge directly into oxbow lakes is primarily from row crop agriculture.

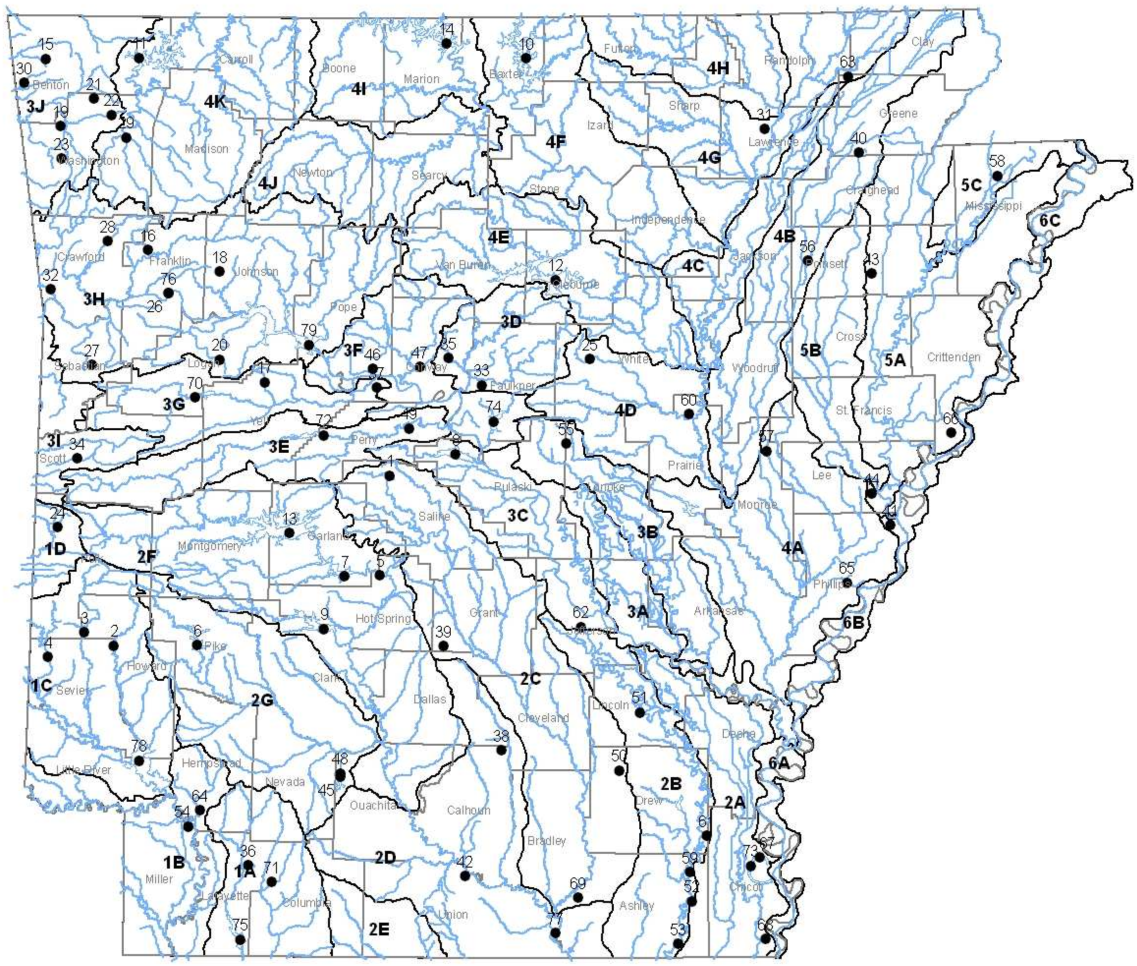
Type E

These are the large lowland lakes of the Delta, Gulf Coastal Plains, 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.

Type NC

These lakes are located in various ecoregions across the State, and for a variety of reasons, have not yet been designated as one of the above mentioned lake types.

Figure III-3: Significant Publicly-Owned Lakes



(Part III)

Table III-18: Significant Publicly-Owned Lakes

No	Lake	County	Acres	Avg. Depth	Water Shed[1]	W/A[2]	Eco Region[3]	Purpose[4]	Type
1	WINONA	SALINE	1240	30	44.4	22.9	OM	W	A
2	DIERKS	HOWARD	1360	22	114	53.6	OM	F	A
3	GILLHAM	HOWARD	1370	21	271	126.6	OM	F	A
4	DEQUEEN	SEVIER	1680	21	169	64.4	OM	F	A
5	CATHERINE	HOT SPRING	1940	18	1516	500.1	OM	H	A
6	GREESON	PIKE	7200	39	237	21.1	OM	H	A
7	HAMILTON	GARLAND	7300	26	1441	126.3	OM	H	A
8	MAUMELLE	PULASKI	8900	23	137	9.9	OM	W	A
9	DEGRAY	CLARK	13200	49	453	22	OM	H	A
10	NORFORK	BAXTER	22000	57	1806	52.5	OH	H	A
11	BEAVER	BENTON	28200	58	1186	26.9	OH	H	A
12	GREERS FERRY	CLEBURNE	31500	60	1153	23.4	BM	H	A
13	OUACHITA	GARLAND	40100	51	1105	17.6	OM	H	A
14	BULL SHOALS	MARION	45440	67	6036	85	OH	H	A
15	CRYSTAL	BENTON	60	12	4.5	48	OH	A	B
16	SHORES	FRANKLIN	82	10	26	202.9	BM	R	B
17	SPRING	YELL	82	23	10.5	82	AV	R	B
18	HORSEHEAD	JOHNSON	100	16	17.3	110.7	BM	R	B
19	WEDINGTON	WASHINGTON	102	16	3	18.8	OH	R	B
20	COVE	LOGAN	160	10	8.5	34	AV	R	B
21	ELMDALE	WASHINGTON	180	8	6	21.3	OH	A	B
22	FAYETTEVILLE	WASHINGTON	196	15	6	19.6	OH	R	B
23	BOBB KIDD	WASHINGTON	200	13	4	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	AV	A	B
26	SUGARLOAF	SEBASTIAN	250	12	5	12.8	AV	A	B
27	NOLAN (Wright)	SEBASTIAN	350	9	3.1	5.7	AV	A	B
28	FT. SMITH	CRAWFORD	1390		73	33.6	BM	W	B
29	SEQUOYAH	WASHINGTON	500	8	275	352	OH	R	B
30	SWEPCO	BENTON	531	17	14	16.9	OH	W	B

Table III-18: Significant Publicly-Owned Lakes

No	Lake	County	Acres	Avg. Depth	Water Shed[1]	W/A[2]	Eco Region[3]	Purpose[4]	Type
31	CHARLES	LAWRENCE	562	8	18	20.5	OH	A	B
32	LEE CREEK	CRAWFORD	634	11	465	469.4	BM	W	B
33	BEAVERFORK	FAULKNER	900	10	11.5	8.2	AV	R	B
34	HINKLE	SCOTT	965	15	27.5	18.2	AV	A	B
35	BREWER	CONWAY	1165	20	36.4	20	AV	W	B
36	JUNE	LAFAYETTE	60	5	4	42.7	GC	A	C
37	BAILEY	CONWAY	124	8	7.5	38.7	AV	R	C
38	TRICOUNTY	CALHOUN	280	7	11.5	26.3	GC	A	C
39	COX CREEK	GRANT	300	6	17	36.3	GC	A	C
40	FRIERSON	GREENE	335	8	7.3	13.9	DL	A	C
41	STORM CREEK	PHILLIPS	420	7	8	12.2	DL	R	C
42	CALION	UNION	510	6	6.7	8.4	GC	A	C
43	POINSETT	POINSETT	550	7	4.5	5.2	DL	A	C
44	BEAR CREEK	LEE	625	10	6	6.1	DL	R	C
45	Upr WHITE OAK	OUACHITA	630	8	20.7	21	GC	A	C
46	ATKINS	POPE	750	6	10.2	8.7	AV	A	C
47	OVERCUP	CONWAY	1025	4	17.2	10.7	AV	A	C
48	Lwr WHITE OAK	OUACHITA	1080	8	42.5	25.2	GC	A	C
49	HARRIS BRAKE	PERRY	1300	6	11.2	5.5	AV	A	C
50	MONTICELLO	DREW	1520	12.5	6.8	2.9	GC	A	C
51	CANE CREEK	LINCOLN	1620	6	24	9.5	GC	A	C
52	WILSON	ASHLEY	150	5	1	4.3	DL	A	D
53	ENTERPIRSE	ASHLEY	200	5	2	6.4	DL	A	D
54	FIRST OLD RIVER	MILLER	200	4	2	6.4	GC	A	D
55	PICKTHORNE	LONOKE	207	5	13.2	40.8	DL	A	D
56	HOGUE	POINSETT	280	4	2	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

Table III-18: Significant Publicly-Owned Lakes

No	Lake	County	Acres	Avg. Depth	Water Shed[1]	W/A[2]	Eco Region[3]	Purpose[4]	Type
59	GRAMPUS	ASHLEY	334	6	2	3.8	DL	A	D
60	DES ARC	PRAIRIE	350	6	1	1.8	DL	A	D
61	WALLACE	DREW	362	5	1	1.8	DL	A	D
62	PINE BLUFF	JEFFERSON	500	6	4	5.1	DL	A	D
63	ASHBAUGH	GREENE	500	5	1	1.3	DL	A	D
64	BOIS D'ARC	HEMPSTEAD	750	4	4	3.4	GC	A	D
65	OLD TOWN	PHILLIPS	900	4	23	16.4	DL	R	D
66	HORSESHOE	CRITTENDEN	1200	10	13.5	7.2	DL	R	E
67	UPPER CHICOT	CHICOT	1270	15	14	7.1	DL	R	E
68	GRAND	CHICOT	1400	7	5.5	2.5	DL	A	E
69	GEORGIA PACIFIC	ASHLEY	1700	4	4	1.5	GC	W	E
70	BLUE MOUNTAIN	LOGAN	2900	9	488	107.7	AV	F	E
71	COLUMBIA	COLUMBIA	2950	11	48	10.4	GC	W	E
72	NIMROD	YELL	3600	8	680	120.9	AV	F	E
73	LOWER CHICOT	CHICOT	4030	15	350	55.6	DL	R	E
74	CONWAY	FAULKNER	6700	5	136	13	AV	A	E
75	ERLING	LAFAYETTE	7000	7	400	36.6	GC	W	E
76	OZARK	FRANKLIN	10600	14	151801	9165.3	AV	N	E
77	FELSENTHAL	BRADLEY	14000	7	10852	496.1	GC	R	E
78	MILLWOOD	LITTLE RIVER	29500	5	4144	89.9	GC	F	E
79	DARDANELLE	POPE	34300	14	153666	2867.2	AV	N	E
		Total	357,896						

Watershed measurements indicate square miles.

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

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

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

Water Quality Standards Development

In cooperation with the Little Rock office of the USGS, the Department initiated a program to develop water quality standards for publicly-owned lakes. The first phase of the program was to identify reference lakes for Type C and D lakes of the Delta and Gulf Coastal Plains ecoregions. The goals of the survey were to: 1) develop a process for identifying potential reference lakes; 2) collect water quality samples from lakes to verify reference conditions;

and 3) propose water quality criteria for the lakes. This portion of the project was completed in fall of 2008.

The next phase of the program is to identify reference lakes for Type B lakes of the Ouachita Mountains, Ozark Highlands, Boston Mountains, and Arkansas River Valley ecoregions. This portion of the program was initiated in fall of 2009.

Lakes on the List of Impaired Water Bodies

Part IV of this report (Table IV-1) lists lakes that have had TMDLs completed (Category 4a). The majority of completed TMDLs have been for mercury contamination of edible fish tissue. Other TMDLs have been completed for either nutrients or turbidity.

The majority of lakes listed in Category 5 on the 303(d) list (Table IV-2) are shown to be impaired by unknown constituents and unknown sources. These lakes were added to the list by EPA Region 6 personnel.

Impaired Uses of Lakes

Table III-19: Lakes Use Support

Degree of Use Support	Monitored Assessment	Total Assessed (acres)
Size Fully Supporting	323,766	323,766
Size Not Supporting	34,130	34,130
Total Assessed (acres)	357,896	357,896

Table III-20: Designated Use Support of Assessed Lakes by Use Type

Use Type	Support (Lake acres)	Non-Support (Lake acres)
Fish consumption	334,259	23,637+
Fisheries	346,648	11,046
Primary contact	357,896	1,500
Secondary contact	357,896	0
Domestic Water Supply	260,791	97,105*
Agri & Industrial Water Supply	357,896	0

+ Total surface acres of the oxbow lakes in the Ouachita River basin are unknown.
* See text above.

Table III-21: Total Sizes of Lakes Listed Not Supporting Uses by Various Source Categories

Source Categories	Number of Lakes	Lake Acres
Surface erosion	2	4,410
Unknown	23	~29,385

Table III-22: Total Sizes of Lakes Listed Not Supporting Uses by Various Cause Categories

Cause Categories	Number of Lakes	Lake Acres
Nutrients (nitrogen & phosphorus)	6	4,165
Siltation/Turbidity	3	4,745
Pathogens	1	1,500
Copper	1	335
Mercury	12+	23,084+
Unknown	5	30,485

+ Total surface acres of the oxbow lakes in the Ouachita River basin are unknown.
* See text above.

Chapter Six WETLANDS

When the first settlers arrived in Arkansas wetland resources comprised over 8.5 million acres over Arkansas's six ecoregions; most 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 Ecoregion 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 Mountain's 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 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 millennia, the Mississippi River deposited silt and organic material over the Delta during floods and created 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 upon their arrival in Arkansas. For 200 years they cleared the timber to farm the fertile soil. The process was slow and labor intensive with only occasional help from the federal government. After World War II, mechanization allowed the clearing of wetland acreage faster than ever before. A dozer could clear more land in one day than some families could clear in a year only a generation earlier. Ninety percent of wetland acreage cleared in the last 35 to 40 years has been due to the expansion of soybean production (Holder 1969).

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

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

Although Arkansas does not have delegated Section 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 made 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 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 owns 3,750 acres of bottomland forest and cypress-tupelo swamp located in Seven Devils Swamp in southeast Arkansas. Through a cooperative agreement, ANHC has a conservation easement for this tract of land. The Ramsar Convention, an international agreement providing the framework for international cooperation for conservation of wetland habitats, proclaimed five state and federally-owned areas as “Wetlands of International

Importance." The designation of the Cache/Lower White River is 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 nineteen such sites in the United States.

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

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

Arkansas Natural Resources Commission administers the Wetland/Riparian Tax Credit Program in consultation with the Private Lands Restoration Committee. This program, created by the Arkansas Private Wetland Riparian Zone Creation and Restoration Incentive Act of 1995, allows a credit against taxes imposed by the Arkansas Income Tax Act for any taxpayer engaged in development or restoration of wetlands and riparian zones. The program is designed to encourage private landowners to restore and enhance existing wetlands and riparian zones, and when possible, create new wetlands and riparian zones because the State continues to experience significant loss of wetlands, and because most lands suitable for wetlands are privately owned. This program benefits landowners through tax credits and Arkansas by increasing wetlands and riparian zones, which provide flood control, water quality enhancement, fish and wildlife habitat, recreation and groundwater recharge.

The Arkansas Wetlands Mitigation Bank Program was established to promote restoration, maintenance, and conservation of aquatic resources, including wetlands, streams, and deep water aquatic habitats; to improve cooperative efforts among private, nonprofit, and public entities involved in this effort; and to offset losses of aquatic resource values caused by activities which otherwise comply with state and federal laws. This program provides a predictable, efficient framework for environmentally acceptable mitigation including off-site mitigation when such mitigation is required.

The Governor's Water Resources and Wetlands Task Force no longer exist, but the Arkansas Multi-Agency Wetland Planning Team (MAWPT) continues its important work. MAWPT developed The Arkansas Wetland Conservation Plan (PLAN).

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.

To date, the MAWPT has completed GIS wetland inventories and prioritization for wetland preservation and restoration in all nine of the Wetland Planning Areas of the Delta, and for all of the Gulf Coastal Plains, Ouachita Mountains, Arkansas River Valley, and Ozark Highlands. The analyses and Wetland Planning Area and Region reports have been completed throughout the State. 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 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 landscape positions of different wetland community types within the class and subclass. Each community type also has a page with a description, photograph, distribution map, and dominant species list. The development of assessment procedure requires identification of functions performed by each subclass, development of models for each function that include variables scientifically shown to affect the function, and calibration of these models using data for reference wetlands in a given geographic region. The MAWPT has identified functions and developed models for wetlands of the State. The MAWPT has collected data from nearly 800 reference wetlands to calibrate the models. The Regional Guidebook for Conducting Functional Assessments of Forested Wetlands has been published for the Delta, Gulf Coastal Plains, Ouachita Mountains, Crowley's Ridge, Arkansas River Valley, and Ozark Highlands regions of Arkansas.

The HGM Classification and fieldwork for the assessment guidebooks also led to projects developing GIS-based potential natural vegetation maps for the Delta region of the State. These maps allow the MAWPT to predict wetland community types based on a series of abiotic characteristics for areas currently in row agriculture. Combined with the preservation and prioritization maps, this allows areas to be targeted both for their priority and the community type they represent.

The MAWPT has completed several pilot studies investigating landscape-level assessment methods, and is still working to develop a viable solution.

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 Potlatch Educational Center at Cook's Lake. This curriculum covers wetland topics such as hydrology, water quality, hydric soils, the water cycle, geomorphology, herpetology, tree identification, map-reading skills, and chapters on birds, mammals, litter decomposers, and other wetland residents. The MAWPT has also assisted with presenting many teacher workshops, helping 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 MAWPT publications, including the Landowner's Guide, the Arkansas Wetland Strategy, and the Bayou Meto WPA Report.

The MAWPT has worked 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 Highlands.

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

LITERATURE CITED FOR CHAPTER SIX

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

Arkansas Natural Resources Commission. 2007. Rules Governing the Arkansas Wetlands Mitigation Bank Program.

Arkansas Natural Resources Commission. 2007. Rules Governing the Tax Credit Program for the Creation and Restoration of Private Wetland and Riparian Zones.

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

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

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

Background

The 1994 Water Quality Inventory report contained an in-depth look at bioaccumulative compounds and trace metals in Arkansas's lakes and streams. It was the culmination of a cooperative effort with the Arkansas Game and Fish Commission (AGFC) to collect, analyze and evaluate data on compounds that could affect public health or aquatic life. The report contained data collected from numerous streams, rivers, and lakes. Overall, data collected and/or analyzed during the 1994 reporting period were 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 predatory 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."

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.

Public Health and Aquatic Life Impacts

Fish Consumption Advisories

Table III-23 lists the current fish consumption advisories for the State. The most significant health advisory changes in the State over the last several 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 this Department, the Arkansas Department of Health, or the Arkansas Game and Fish Commission for the latest advisories.

Table III-23: Fish Consumption Advisories in Place as of January, 2000

<table>
<tr><th rowspan="3">Waterbody /Reach No.</th><th rowspan="3">Type</th><th rowspan="3">Size Affected</th><th colspan="4">Type Fish Consumption Restricted</th><th rowspan="3">Pollutant of Concern</th></tr>
<tr><th colspan="2">No Consumption</th><th colspan="2">Lim. Consumption</th></tr>
<tr><th>Gen Pop</th><th>High Risk</th><th>Gen Pop</th><th>High Risk</th></tr>
<tr><td rowspan="2">Bayou Bartholomew
08040205–002
08040205–012</td><td>River</td><td>~48 miles</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">High risk groups should not consume flathead catfish, gar, bowfin, pickerel, and blue catfish over 20”, largemouth bass over 12”, or buffalo over 18”.
The general public should not consume more than 2 meals per month of flathead catfish, gar, pickerel, bowfin, or blue catfish over 20” in length, largemouth bass over 12” in length, or buffalo over 18” in length.</td></tr>
<tr><td rowspan="2">Bayou Meto
08020402–007</td><td>Stream</td><td>~48 miles</td><td>X</td><td>X</td><td></td><td></td><td>Dioxin</td></tr>
<tr><td colspan="7">Consumption of fish from this area is not recommended due to dioxin contamination. This applies to all risk groups.</td></tr>
<tr><td rowspan="2">Big Cr Tributary
11140203–XXX</td><td>Stream</td><td>~2 miles</td><td>X</td><td>X</td><td></td><td></td><td>PCBs</td></tr>
<tr><td colspan="7">This stream is closed to fishing due to polychlorinated biphenyl contamination.</td></tr>
<tr><td rowspan="2">Big Johnson Lake
(Calhoun County)</td><td>Lake</td><td>80 acres</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">High risk groups have no restrictions on consumption of crappie or buffalo. They should not consume all other predators and non-predators.
The general public has no restrictions on the consumption of crappie or buffalo. They should not consume more than two (2) meals per month of all other predators. There is no restriction on consumption of non-predator fish.</td></tr>
<tr><td rowspan="2">Champagnolle
08040201–003
L. Champagnolle
08040201–903</td><td>Stream</td><td>~20 miles</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">High risk groups should not consume predator or non-predator species over 13”.
The general public should not consume more than 2 meals per month of the predator species over 13”. There are no restrictions on non-predator species.</td></tr>
<tr><td rowspan="2">Lake Columbia</td><td>Lake</td><td>2,950 acres</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">High risk groups do not have any restrictions on the consumption of crappie, channel or blue catfish. They should not consume all other predators and non-predators.
The general public has no restrictions on the consumption of largemouth bass less than 16 inches in length, or crappie, channel and blue catfish. They should not consume all other predators. There are no restrictions on non-predator fish.</td></tr>
<tr><td rowspan="2">Cove Creek Lake
(Perry County)</td><td>Lake</td><td>46 acres</td><td></td><td></td><td>X</td><td>X</td><td>Mercury</td></tr>
<tr><td colspan="7">High risk groups should not consume largemouth bass 12” or longer. There are no restrictions on all other predator or non-predator species.
The general public should not consume more than 2 meals per months of largemouth bass 12-16” in length. They should not consume largemouth bass greater than 16” in length. There are no restrictions on all other predator or non-predator species.</td></tr>
<tr><td rowspan="2">Cut-Off Creek
08040205–007</td><td>Stream</td><td>16.8 miles</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">High risk groups should not consume predator or non-predator species.
The general public should consume no more than 2 meals per month of the predator species. They should not consume the non-predator species.</td></tr>
<tr><td rowspan="2">Dorcheat Bayou
11140203–020
11140203–022
11140203–024
11140203–026</td><td>Stream</td><td>50.6 miles</td><td></td><td>X</td><td>X</td><td></td><td>Mercury</td></tr>
<tr><td colspan="7">High risk groups should not consume predator or non-predator species.
The general public should not consume largemouth bass >16” in length or consume more than 2 meals per month of all other predator species.</td></tr>
<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.</td></tr>
</table>

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	
	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.						
Dupree Lake	Lake	<10 acres	X	X			Dioxin
	Consumption of fish from this area is not recommended due to dioxin contamination. This applies to all risk groups.						
Felsenthal Lake	Lake	14,000 acres		X			Mercury
	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.						
Fourche La Fave River 11110206–002	River	8.7 miles			X	X	Mercury
	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.						
Grays Lake (Cleveland County)	Lake	22 acres		X	X		Mercury
	High risk groups should not consume largemouth bass over 13" in length, flathead catfish over 26" in length, or any gar, bowfin or pickerel. The general public should not consume any largemouth bass over 16" in length. 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.						
Johnson Hole (Van Buren County)	Lake	~50 acres			X	X	Mercury
	High risk groups should not consume largemouth bass over 16" in length. The general public should not consume largemouth bass over 16" in length.						
Moro Bay Creek 08040201–001	Stream	~12 miles	X	X			Mercury
	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.						
Nimrod Lake	Lake	3,600 acres			X	X	Mercury
	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.						
Ouachita River 08040201–002 08040201–004 08040202–002 08040202–003 08040202–004	River	66.3 miles	X	X			Mercury
	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.						
Saline River 08040204–001 08040204–002	River	55.8 miles	X	X			Mercury
	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.						
Saline River	River	33.9 miles		X	X		Mercury

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	
08040204–004 08040204–006	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.						
Lake Fort Smith	Lake	1,390 acres			X	X	Mercury
Formerly Shepherd Springs Lake Area (Crawford County)	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.						
South Fork Little Red River 11010014–036	River	2.0 miles			X	X	Mercury
	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.						
Lake Winona (Saline County)	Lake						
	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.						
Oxbow Lakes	All types	1,240 acres			X	X	Mercury
	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. The general public should not consume predator species. They should not consume more than 2 meals per month of all non-predator species. There are no restrictions on the consumption of buffalo or crappie.						
Spring Lake (Yell County)	Lake	Total Area not known	X	X			Mercury
	High risk groups should not consume largemouth bass 16” or longer from this lake. The general public should not consume more than 2 meals per month of largemouth bass 16” or longer.						
Lake Sylvia (Perry County)	Lake	82 acres			X	X	Mercury
	High risk groups should not consume largemouth bass 16” or longer from this lake. The general public should not consume more than 2 meals per month of largemouth bass 16” or longer.						

Public Water Supply/Drinking Water Use

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 9737.4 miles assessed for these parameters for drinking water use support, 92.5 miles were not meeting the use. Many of the exceedances were from nitrate values greater than 10 milligram per liter (mg/L). In addition, several miles of streams have had the drinking water designated use removed through site specific amendments to the water quality standards.

Source Water Protection Program, Arkansas Department of Health

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

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

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PART IV WATER QUALITY LIMITED WATER BODIES 303(D) LIST

Introduction

Clean Water Act Section 303(d) 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 2012 list of impaired water bodies (303(d) list) contained in this report has not yet been approved by the U. S. Environmental Protection Agency.*

Methodology

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

Water Quality Limited Waters

The 2012 list of impaired waterbody segments is divided into two tables: a list of stream segments not currently meeting water quality standards but have completed TMDLs (Table IV-1 and Figure IV-1); and those water bodies listed in Category 5 as described below (Table IV-2 and Figure IV-2).

The waterbody may be impaired, or one or more water quality standards may not be attained. Water bodies in Category 5 will be prioritized in the following manner:

a. High
   - Truly impaired; develop a TMDL or other corrective action(s) for the listed parameter(s).

b. Medium
   - Waters currently not attaining standards, but may be de-listed with future revisions to Regulation No. 2, the state water quality standards; or
   - Waters which are impaired by point source discharges and future permit restrictions are expected to correct the problem(s).

c. Low
   - Waters currently not attaining one or more water quality standards, but all designated uses are determined to be supported; or
   - There are insufficient data to make a scientifically defensible decision concerning designated use attainment; or
   - Waters the Department assessed as unimpaired, but were added to the list by EPA.

Key to Table IV-1 and IV-2 abbreviations:

Designated Use Not Supported: uses specified in water quality standards for each waterbody or stream segment which are not being supported.

AI = agricultural and/or industrial water supply
DW = domestic water supply
FC = fish consumption
FSH = fisheries
PC = primary contact
SC = secondary contact

Assessment Method:

e = evaluated assessment
M = monitored assessment

Water Quality Standard Non-Attainment: contaminant identified as the cause of impairment

Al = aluminum
AM = ammonia
Be = beryllium
Cd = cadmium
CL = chlorides
Cu = copper
DO = dissolved oxygen
Hg = mercury
Ni = Nickel
NU = nutrients[2]
NO3 = nitrate nitrogen
OE = organic enrichment/low dissolved oxygen
PA = pathogen indicator bacteria
Pb = lead
pH = pH
PO = priority organics
SI = siltation/turbidity
SO4 = sulfates
Tb = turbidity
TDS = total dissolved solids
Tm = temperature
TP = total phosphorus
Zn = zinc

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

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

Priority Rank - A ranking of waters in order of need for corrective action taking into account the severity of the pollution and designated uses of the waters.

H = High priority: highest risk of affecting public health or welfare; substantial impact on aquatic life.
M = Medium priority: moderate risk to public health, welfare or to aquatic life.
L = Low priority: lowest risk to public health or welfare; secondary impact on aquatic life.

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.

HUC - Reach - a numerical identifier of a specific segment of a stream

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

Station - water quality monitoring station number

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

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

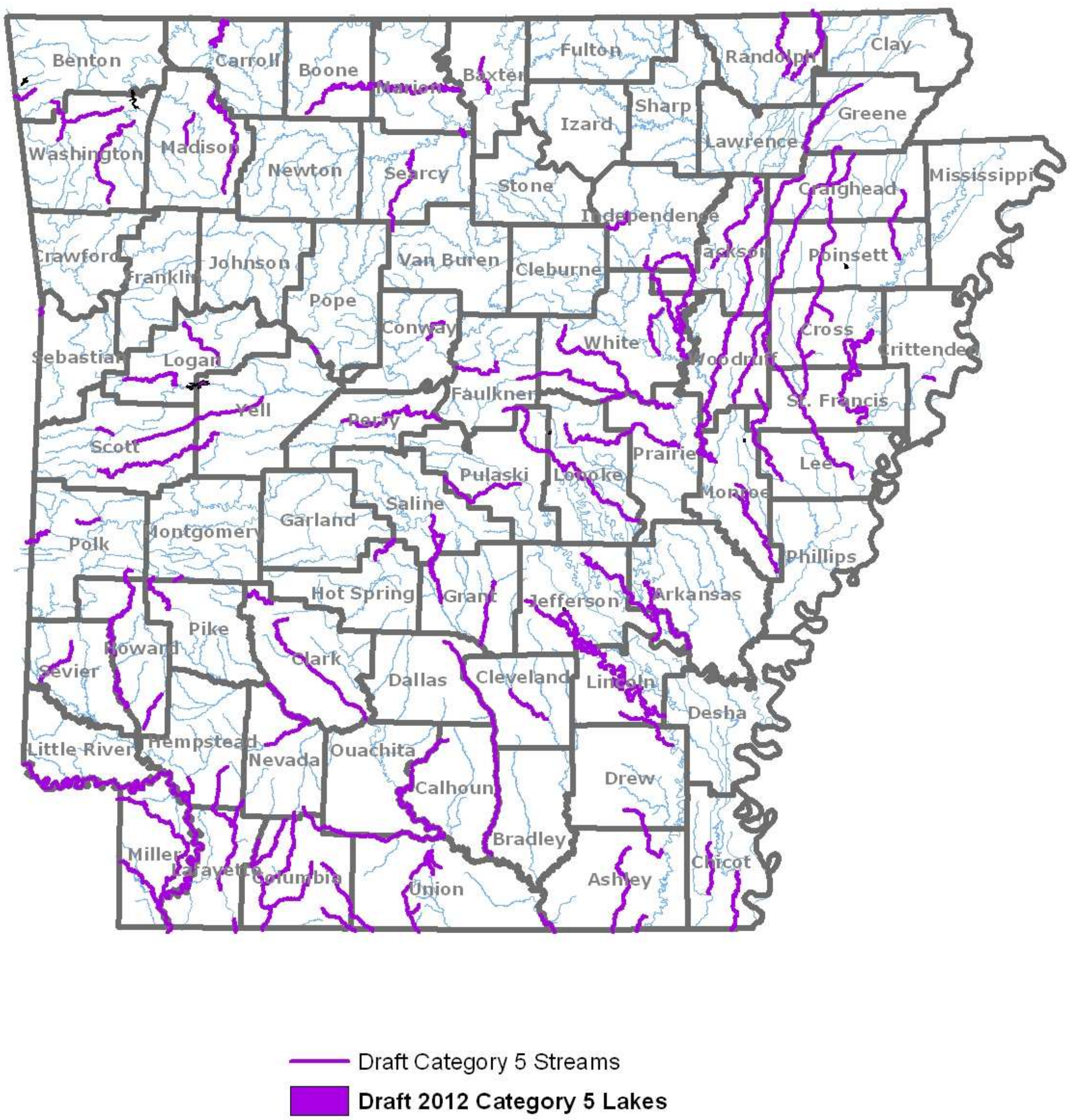

Table IV-1: Water Quality Limited Waterbodies (Category 4a) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	Designated Use Not Supported						Water Quality Standard Non-Attainment													Source of Contamination					
						FC	FSH	PC	SC	DW	AI	DO	pH	Tm	Tb	Cl	SO4	TDS	PA	Cu	Pb	Zn	Other		IP	MP	SE	AG	UR	Other
Dorcheat Bayou	11140203	-022	1A	8.4	RED0015A	X																		Hg						UN
Dorcheat Bayou	11140203	-020	1A	11.9	e	X																		Hg						UN
Dorcheat Bayou	11140203	-026	1A	11.7	UWBDT01,02	X																		Hg						UN
Dorcheat Bayou	11140203	-024	1A	7.0	e	X																		Hg						UN
Days Creek	11140302	-003	1B	11.0	RED0004A					X														NO3		X				
Rolling Fork	11140109	-919	1C	12.8	RED0058																		TP	NO3	X					
Oak Bayou	8050002	-910	2A	18.3	OUA0179		X			X	X				X	X		X										X		
Boeuf River	8050001	-018	2A	49.4	OUA0015A		X				X				X	X	X	X										X		
Boeuf River	8050001	-019	2A	58.1	UWBFR01		X			X	X				X	X												X		
Bayou Bartholomew	8040205	-001	2B	60.1	OUA0013		X								X													X		
Bayou Bartholomew	8040205	-002	2B	17.9	UWBYB01	X	X								X									Hg				X		UN
Melton's Creek	8040205	-903	2B	8.7	OUA0148			X											X											UN
Harding Creek	8040205	-902	2B	4.6	OUA0145			X											X									X	X	
Deep Bayou	8040205	-005	2B	28.9	OUA0151		X	X							X				X								X	X		UN
Bayou Bartholomew	8040205	-006	2B	82.3	OUA0033		X								X													X		
Cutoff Creek	8040205	-007	2B	16.8	UWCOC01	X									X									Hg			X			UN
Bayou Bartholomew	8040205	-912	2B	82.7	UWBYB02		X								X													X		
Cross Bayou	8040205	-905	2B	2.4	OUA0152			X											X											UN
Bayou Bartholomew	8040205	-013	2B	33.9	UWBYB03		X	X							X	X			X									X		
Bayou Bartholomew	8040205	-012	2B	25.0	UWBYB02	X	X								X									Hg				X		UN
Chemin-A-Haut Cr.	8040205	-907	2B	30.5	OUA0012			X											X											UN
Big Creek	8040203	-904	2C	10.0	OUA0018		X					X			X									OE		X				
Saline River	8040203	-001	2C	0.2	OUA0010A,117	X																		Hg						UN
Saline River	8040204	-001	2C	2.8	e	X																		Hg						UN
Saline River	8040204	-002	2C	53	e	X																		Hg						UN
Saline River	8040204	-004	2C	16.4	e	X																		Hg						UN
Big Creek	8040204	-005	2C	28.9	OUA0043										X												X			
Saline River	8040204	-006	2C	17.5	OUA0118	X																		Hg						UN
Ouachita River	8040202	-002	2D	4	OUA008B	X																		Hg						UN
Ouachita River	8040202	-003	2D	8.4	e	X																		Hg						UN
Ouachita River	8040202	-004	2D	28.9	OUA0124B	X																		Hg						UN
Bayou De L'Outre	8040202	-006	2D	32.4	OUA0005												X	X							X					
Bayou De L'Outre	8040202	-007	2D	6.9	e												X	X							X					
Bayou De L'Outre	8040202	-008	2D	10.6	e												X	X							X					
Moro Creek	8040201	-001	2D	12	OUA0028	X									X									Hg						UN
Moro Creek	8040201	-901	2D	57.9	e										X												X			
Ouachita River	8040201	-002	2D	22.5	OUA008B	X																		Hg						UN
Ouachita River	8040201	-004	2D	2.5	OUA0037	X																		Hg						UN
L. Champagnolle Cr.	8040201	-903	2D	20.9	e	X																		Hg						UN
Champagnolle	8040201	-003	2D	20	UWCHC01	X																		Hg						UN
Elcc Tributary	8040201	-606	2D	8.5	OUA0137A+		X			X						X	X	X					AM		X					
Flat Creek	8040201	-706	2D	16	OUA0137C		X			X						X	X	X												RE
Salt Creek	8040201	-806	2D	8.0	OUA0137D		X			X						X		X												RE

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

STREAM NAME	HUC	RCH	PLNG	MILES	MONITORING	Designated Use Not Supported						Water Quality Standard Non-Attainment													Source of Contamination					
			SEG		STATIONS	FC	FSH	PC	SC	DW	AI	DO	pH	Tm	Tb	Cl	SO4	TDS	PA	Cu	Pb	Zn	Other		IP	MP	SE	AG	UR	Other
Prairie Creek	8040101	-048	2F	10.0	OUA0040										X												X			
Caddo River	8040102	-019	2F	7.7	OUA0023															X										RE
Caddo River	8040102	-018	2F	4.1	OUA0023															X										RE
Caddo River	8040102	-016	2F	13.5	OUA0023															X										RE
Wabbaseka Bayou	8020401	-003	3A	101.7	UWWSB01										X															
Fourche LaFave	11110206	-002	3E	8.7	e	X																		Hg						UN
White Oak Creek	11110203	-927	3F	10.0	ARK0053		X								X															UN
Stone Dam Creek	11110203	-904	3F	3.0	ARK0051		X			X													AM	NO3		X				
Whig Creek	11110203	-931	3F	10	ARK0067		X			X										X				NO3		X				
Poteau River	11110105	-001	3I	2	ARK0014		X								X												X			
Poteau River	11110105	-031	3I	6.6	ARK0055		X													X		X	TP		X	X				
Town Branch	11070208	-903	3J	3.0	ARK0056		X																TP		X					
Cache River Ditch	8020302	-032	4B	11.4	e		X								X													X		
Cache River	8020302	-031	4B	3.4	e		X								X													X		
Cache River	8020302	-029	4B	3.9	e		X								X													X		
Cache River	8020302	-028	4B	5.9	UWCHR04		X								X													X		
Cache River	8020302	-027	4B	3.9	e		X								X													X		
S. Fk. L. Red River	11010014	-036	4E	2.0	e	X																		Hg						UN
M. Fk. Little Red	11010014	-028	4E	12.0	e			X											X											UN
M. Fk. Little Red	11010014	-027	4E	8.8	WHI0043			X											X											UN
North Fork River	11010006	-001	4F	4.2	USGS							X																		HP
Strawberry River	11010012	-011	4G	20.4	UWSBR01		X								X												X			
L. Strawberry River	11010012	-010	4G	16.0	WHI0143H+		X								X												X			
Strawberry River	11010012	-009	4G	28.4	UWSBR02		X								X												X			
Strawberry River	11010012	-008	4G	8.4	e		X								X												X			
Strawberry River	11010012	-006	4G	19.0	WHI0024		X								X												X			
Strawberry River	11010012	-005	4G	0.7	e		X								X												X			
Strawberry River	11010012	-004	4G	0.3	e		X								X												X			
Strawberry River	11010012	-002	4G	9.4	UWSBR03		X								X												X			
White River	11010003	-902	4I	3.0	USGS							X																		HP
West Fork	11010001	-024	4K	27.2	WHI0051		X								X												X			
White River	11010001	-023	4K	6.2	WHI0052		X								X												X			
Blackfish Bayou	8020203	-003	5A	2.4	FRA0027		X								X													X		
Blackfish Bayou	8020203	-005	5A	2.6	e		X								X													X		
Blackfish Bayou	8020203	-007	5A	16.1	e		X								X													X		
L'Anguille River	8020205	-001	5B	19.7	FRA0010		X								X													X		
L'Anguille River	8020205	-002	5B	16.8	e		X								X													X		
L'Anguille River	8020205	-003	5B	1.8	e		X								X													X		
L'Anguille River	8020205	-004	5B	16.0	UWLGR01		X	X							X				X									X		
L'Anguille River	8020205	-005	5B	44.1	UWLGR02		X	X							X				X									X		

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

LAKE NAME	HUC	LAKE	PLNG	ACRES	COUNTY	ASSESSMENT	Designated Use Not Supported						SOURCE			CAUSE			TMDL	Year
		TYPE	SEG			METHOD	FC	FSH	PC	SC	DW	AI	1	2	3	1	2	3	DATE	Listed
Columbia	11140203	E	1A	3000	Columbia	M	X						UN			HG			2002	2002
First Old Rive	11140201	D	1B	240	Miller	M		X					UN			NU			2007	2004
Grand	8050002	E	2A	900	Chicot	M		X					UN			NU			2007	2004
Grays	8040204	NC	2C	36	Cleveland	M	X						UN			HG			2004	2002
Monticello	8040204	B	2C	1520	Drew	M	X						UN			HG			2004	2002
Winona	8040203	A	2C	715	Saline	M	X						UN			HG			2002	2002
Ouachita River Oxbow s below Camden	8040202		2D		Ashley Calhoun Union Bradley Ouachita	M	X						UN			HG			2002	2002
Big Johnson	8040201	NC	2D	49	Calhoun	M	X						UN			HG			2004	2002
Felsenthal	8040202	E	2D	14,000	Bradley	M	X						UN			HG			2004	2002
Cove Creek	11110202	B	3H	42	Logan	M	X						UN			HG			2002	2002
Nimrod	11110206	E	3E	3550	Yell	M	X						UN			HG			2002	2002
Dry Fork	11110206		3E	90	Perry	M	X						UN			HG			2002	202
Horseshoe	8020203	E	5A	1200	Crittenden	M		X					UN			NU			2007	2004
Frierson	8020302	C	4B	335	Greene	M		X					UN			SI			2007	2004
Johnson Hole	11010014	A	4E	26	Van Buren	M	X						UN			HG			2002	2002
Spring	11110204	B	3G	82	Yell	M	X						UN			HG			2004	2002
Old Tow n	8020302	D	4A	900	Phillips	M		X					UN			NU			2007	2004
Bear Creek	8020205	C	5B	625	Lee	M		X					UN			NU			2007	2004
Mallard	8020204	D	5C	300	Mississippi	M		X					UN			NU			2007	2004

Table IV-2: Water Quality Limited Waterbodies (Category 5) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	Designated Use Not Supported						Water Quality Standard Non-Attainment												SOURCE						
						FC	FSH	PC	SC	DW	AI	DO	pH	Tm	Tb	Cl	SO4	TDS	PA	Cu	Pb	Zn	Other	IP	MP	SE	AG	UR	Other	Priority
Dorcheat Bayou	11140203	-026	1A	11.7	UWBDT02		x						x								x								UN	L
Beech Creek	11140203	-025	1A	15.7	UWBCH01		x					x			x						x								UN	H
Dorcheat Bayou	11140203	-024	1A	7.0	RED0065								x																UN	L
Big Creek	11140203	-923	1A	18.5	UWBIG01		x						x								x			x						L
Big Creek	11140203	-023	1A	3.3	UWBIG02		x				x					x	x	x			x			x						L
Dorcheat Bayou	11140203	-022	1A	8.4	RED0015A		x				x		x				x				x								UN	L
Horsehead Creek	11140203	-021	1A	16.8	UWHHC01		x						x								x								UN	L
Dorcheat Bayou	11140203	-020	1A	11.9	e		x				x		x				x				x								UN	L
Bodcau Creek	11140203	-007	1A	7.8	RED0057		x														x								UN	L
Little Bodcau Creek	11140205	-010	1A	19.5	RED0056		x					x									x								UN	L
Bodcau Creek	11140205	-006	1A	22.4	RED0027		x						x		x						x					x			UN	M
Bodcau Creek	11140205	-002	1A	6.0	e		x						x		x						x					x			UN	M
Red River	11140106	-025	1B	8.0	e						x				x	x	x	x											UN	L
Red River	11140106	-005	1B	25.3	RED0025						x				x	x	x	x											UN	L
Red River	11140106	-003	1B	9.8	e						x				x	x	x	x											UN	L
Red River	11140106	-001	1B	34.8	e						x				x	x	x	x											UN	L
McKinney Bayou	11140201	-014	1B	21.6	RED0055						x						x	x											UN	L
McKinney Bayou	11140201	-012	1B	23.1	RED0054						x					x	x	x											UN	L
Red River	11140201	-011	1B	15.2	RED0046						x				x			x								x			UN	L
Bois D"Arc Creek	11140201	-008	1B	8.9	UWBDK02							x																	UN	L
Red River	11140201	-007	1B	40.1	RED0045						x				x			x								x			UN	L
Red River	11140201	-005	1B	12.0	e						x				x			x								x			UN	L
Red River	11140201	-004	1B	4.0	e						x				x			x								x			UN	L
Red River	11140201	-003	1B	15.5	RED0009						x				x			x								x			UN	L
Sulphur River	11140302	-008	1B	0.8	e		x			x				x	x		x	x								x			UN	L
Sulphur River	11140302	-006	1B	6.5	RED0005		x			x				x	x		x	x								x			UN	L
Sulphur River	11140302	-004	1B	0.7	e		x			x				x	x		x	x								x			UN	L
Sulphur River	11140302	-001	1B	6.3	e		x			x				x	x		x	x								x			UN	L
Sulphur River	11140302	-002	1B	8.5	e		x			x				x	x		x	x								x			UN	L
Mine Creek	11140109	-933	1C	1.3	RED0048B												x							x						H
Mine Creek	11140109	-033	1C	11.4	RED0018B												x							x						L
Saline River	11140109	-010	1C	15.2	RED0021		x								x					x									H	L
Saline River	11140109	-014	1C	25.1	RED0032		x					x																	UN	L
Bear Creek	11140109	-025	1C	17.3	RED0033																		NO3	x	x					H
Mountain Fork	11140108	-014	1D	11.0	RED0001										x														UN	L
Beouf River	8050001	-019	2A	58.1	UWBFR01												x												UN	L
Bayou Macon	8050001	-003	2A	80.5	UWBYM01											x													UN	L
Chemin-A-Haut Cr.	8040205	-907	2B	30.5	OUA0012							x																	UN	L
Main Street Ditch	8040205	-909	2B	2.0	OUA0146		x					x									x							x		M
Harding Creek	8040205	-902	2B	4.6	OUA0145		x														x							x		M
Bayou Imbeau	8040205	-910	2B	7.5	OUA0147		x					x									x							x		M
Able's Creek	8040205	-911	2B	14.6	OUA0158										x														UN	M
Bearhouse Creek	8040205	-901	2B	24.4	OUA0155		x					x									x								UN	M

Table IV-2 (cont.): Water Quality Limited Waterbodies (Category 5) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	Designated Use Not Supported						Water Quality Standard Non-Attainment												SOURCE						
						FC	FSH	PC	SC	DW	AI	DO	pH	Tm	Tb	Cl	SO4	TDS	PA	Cu	Pb	Zn	Other	IP	MP	SE	AG	UR	Other	Priority
Bayou Bartholomew	8040205	-013	2B	33.9	UWBYB03							x															x			M
Bayou Bartholomew	8040205	-006	2B	82.3	OUA0033																x								UN	L
Cross Bayou	8040205	-905	2B	2.4	OUA0152							x																	UN	
Overflow Creek	8040205	-908	2B	9.9	OUA0012A		x								x	x										x			UN	M
Saline River	8040203	-010	2C	29.8	OUA0026,41										x			x								x			UN	H
Hurricane Creek	8040203	-004	2C	19.5	OUA0116													x											RE	
Saline River	8040204	-006	2C	17.5	OUA0118										x			x								x			UN	L
Smackover Creek	8040201	-007	2D	29.1	e		x					x																	UN	M
Smackover Creek	8040201	-006	2D	14.8	OUA0027		x					x																	UN	M
Flat Creek	8040201	-706	2D	16.0	OUA0137C		x						x												x					H
Salt Creek	8040201	-806	2D	8.0	OUA0137D		x						x																UN	H
Elcc Tributary	8040201	-606	2D	8.5	OUA0137A+		x						x							x				x						H
Ouachita River	8040201	-005	2D	34.2	OUA0037		x													x									UN	L
E. Two Bayou	8040201	-905	2D	30.7	OUA0052B			x					x						x										UN	
Moro Creek	8040201	-001	2D	12.0	OUA0028		x													x	x								UN	L
Moro Creek	8040201	-901	2D	57.9	e		x													x	x								UN	L
Ouachita River	8040202	-002	2D	4.0	OUA0008B		x								x														UN	L
Walker Branch	8040206	-916	2E	3.0	e		x								x		x					x							RE	M
Little Cornie Bayou	8040206	-816	2E	3.0	e		x								x		x					x							RE	M
Little Cornie Bayou	8040206	-716	2E	5.0	e		x								x		x					x							RE	M
Little Cornie Creek	8040206	-016	2E	18.0	e		x								x		x					x							RE	M
Big Cornie Creek	8040206	-015	2E	15.0	OUA0002		x								x		x					x							RE	M
Cove Creek	8040102	-970	2F	7.8	OUA0100 OUA0159		x			x	x		x				x	x						x					RE	H
Chamberlain Creek	8040102	-971	2F	2.5	OUA0104 OUA0171A		x			x	x		x				x	x		x		x	Al, Be, Cd, Ni	x					RE	H
Lucinda Creek	8040102	-975	2F	2.2	OUA0171B		x						x							x		x	Al						RE	H
Cove Creek	8040102	-976	2F	3.6	OUA0171C								x																UN	L
Prairie Creek	8040101	-048	2F	10.0	OUA0040		x					x								x									UN	M
D.C. Creek	8040102	-923	2F	5.0	OUA0044T																	x							RE	L
Caddo River	8040102	-016	2F	13.5	OUA0023		x								x														RE	H
L. Missouri River	8040103	-008	2G	19.6	OUA0035		x								x														UN	H
L. Missouri River	8040103	-022	2G	17.6	OUA0022		x													x									UN	H
Terre Noir Creek	8040103	-003	2G	19.6	UWTNO01								x																UN	L
Terre Noir Creek	8040103	-002	2G	27.4	UWTNR02								x																UN	L
Terre Rouge Creek	8040103	-031	2G	14.5	UWTRC01										x											x				L
Wabbaseka Bayou	8020401	-003	3A	35.4	UWWSB01		x					x																	UN	L
Bayou Meto	8020402	-001	3B	4.3	e		x					x																	UN	L
Bayou Meto	8020402	-003	3B	39.8	ARK0023		x					x																	UN	L
Bayou Meto	8020402	-907	3B	12.3	ARK0060		x					x																	UN	L
Bayou Meto	8020402	-007	3B	44.8	ARK0050		x					x											PO	x						H
Fourche Creek	11110207	-024	3C	11.2	ARK0130+										x											x				L
Fourche Creek	11110207	-022	3C	9.2	ARK0131+		x								x					x						x			UN	L
Cypress Creek	11110205	-917	3D	11.2	ARK0132		x													x		x					x			L
E. Fork Cadron Creek	11110205	-002	3D	15.6	ARK0158+										x											x				
Fourche LaFave R.	11110206	-007	3E	20.2	ARK0037		x					x																	UN	L
Fourche LaFave R.	11110206	-008	3E	25.7	UWFLR01								x																UN	L
Fourche LaFave R.	11110206	-001	3E	25.7	ARK0036		x					x																	UN	L

Table IV-2 (cont.): Water Quality Limited Waterbodies (Category 5) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	Designated Use Not Supported						Water Quality Standard Non-Attainment												SOURCE						
						FC	FSH	PC	SC	DW	AI	DO	pH	Tm	Tb	Cl	SO4	TDS	PA	Cu	Pb	Zn	Other	IP	MP	SE	AG	UR	Other	Priority
Arkansas River	11110203	-932	3F	2.0	Special study							x																	HP	H
Petit Jean River	11110204	-011	3G	21.6	ARK0034		x								x											X				H
Dutch Creek	11110204	-015	3G	28.9	ARK0057		x					x			x														UN	H
Short Mountain Cr.	11110202	-043	3H	14.9	ARK0011B		x													x					x					H
Poteau River	11110105	-001	3I	2.0	ARK0014		x					x																	UN	L
Poteau River	11110105	-031	3I	6.6	ARK0055													x						x	x					M
Illinois River	11110103	-023	3J	8.1	ILL04			x											x								x			L
Clear Creek	11110103	-029	3J	13.5	ARK0010C			x											x									x		L
Illinois River	11110103	-024	3J	2.5	ARK0040			x							x				x							x	x			L
Sager Creek	11110103	-932	3J	8.0	ARK0005																		NO3		x					H
Muddy Fork Illinois River	11110103	-025	3J	3.2	MFI0004			x											x								x			L
Boat Gunwale Slash	8020304	-914	4A	5.0	WHI0074							x																	UN	L
Prairie Cypress	8020304	-014	4A	26.1	WHI0073							x								x									UN	L
Big Creek	8020304	-010	4A	34.3	UWBGC03											x		x									x			L
Cache River Ditch	8020302	-032	4B	11.4	e		x											x			x						x			L
Cache River	8020302	-031	4B	3.4	e		x											x			x						x			L
Cache River	8020302	-029	4B	3.9	e		x											x			x						x			L
Cache River	8020302	-028	4B	5.9	UWCHR04		x											x			x						x			L
Cache River	8020302	-027	4B	3.9	e		x											x			x						x			L
Cache River	8020302	-021	4B	18.4	e		x														x						x			L
Cache River	8020302	-020	4B	22.6	UWCHR03		x														x						x			L
Cache River	8020302	-019	4B	13.7	e		x														x						x			L
Cache River	8020302	-018	4B	25.0	UWCHR02		x														x						x			L
Cache River	8020302	-017	4B	15.8	e		x														x						x			L
Cache River	8020302	-016	4B	21.8	WHI0032		x														x						x			L
Bayou DeView	8020302	-009	4B	20.3	WHI0026		x													x									UN	H
Bayou DeView	8020302	-007	4B	18.2	e		x														x						x			L
Bayou DeView	8020302	-006	4B	10.2	e		x														x						x			L
Bayou DeView	8020302	-005	4B	8.6	e		x														x						x			L
Bayou DeView	8020302	-004	4B	21.2	UWBDV02		x														x						x			L
Big Creek Ditch	8020302	-910	4B	13.0	WHI0196		x													x									UN	
Lost Creek Ditch	8020302	-909	4B	7.9	WHI0172		x									x								x	x					M
Departee Creek	11010013	-020	4C	46.1	UWDTC01		x															x					x			L
Glaise Creek	11010013	-021	4C	30.1	UWGSC01		x															x					x			L
Village Creek	11010013	-008	4C	13.0	e							x																	UN	L
Village Creek	11010013	-007	4C	1.2	e							x																	UN	L
Village Creek	11010013	-006	4C	25.2	UWVGC01+							x																	UN	L
Wattensaw Bayou	8020301	-015	4D	48.2	WHI0072							x																	UN	L
Cypress Bayou	8020301	-010	4D	5.0	UWCPB01		x														x						x			L
Bull Creek	8020301	-009	4D	29.0	UWBLB01		x															x					x			L
Bayou Des Arc	8020301	-007	4D	36.4	UWBDA01		x															x					x			L
Bayou Des Arc	8020301	-006	4D	17.8	WHI0056		x															x					x			L
Overflow Creek	11010014	-006	4E	21.7	UWOFC01		x															x					x			L
Overflow Creek	11010014	-004	4E	0.6	e		x															x					x			L

Table IV-2 (cont.): Water Quality Limited Waterbodies (Category 5) – 303(d) List

STREAM NAME	HUC	RCH	PLNG SEG	MILES	MONITORING STATIONS	Designated Use Not Supported						Water Quality Standard Non-Attainment												SOURCE						
						FC	FSH	PC	SC	DW	AI	DO	pH	Tm	Tb	Cl	SO4	TDS	PA	Cu	Pb	Zn	Other	IP	MP	SE	AG	UR	Other	Priority
Hicks Creek	11010004	-015	4F	9.1	WHI0065			x											x						x					H
Greenbrier Creek	11010004	-017	4F	10.6	WHI0167		x	x				x							x										UN	L
Current River	11010008	-017	4G	12.0	e		x								x											x				M
Current River	11010008	-001	4G	23.6	WHI0004		x								x											x				M
Fourche River	11010009	-008	4G	25.0	WHI0170		x								x											x				L
Crooked Creek	11010003	-048	4I	31.7	WHI0048A+													x											RE	L
Crooked Creek	11010003	-049	4I	36.2	WHI0067+											x	x	x											UN	L
Big Creek	11010005	-027	4J	2.6	BUFT18		x					x																	UN	L
Bear Creek	11010005	-026	4J	23.9	UWBRK01+					x								x							x					L
Holman Creek	11010001	-059	4K	9.1	WHI0070					x								x							x					L
Kings River	11010001	-037	4K	19.1	WHI0009A													x											UN	L
Kings River	11010001	-042	4K	39.5	WHI0123													x											UN	L
White River	11010001	-023	4K	6.2	WHI0052											x	x	x											UN	H
West Fork	11010001	-024	4K	27.2	WHI0051		x										x	x											UN	H
St. Francis River	8020203	-014	5A	22.8	FRA0008											x											x			L
St. Francis River	8020203	-009	5A	17.1	e										x	x											x			L
St. Francis River	8020203	-008	5A	55.9	FRA0013										x	x											x			L
Ten Mile Bayou	8020203	-906	5A	17.3	FRA0029		x					x																	UN	L
Caney Creek	8020205	-901	5B	9.0	FRA0034													x							x					L
Second Creek	8020205	-008	5B	16.4	FRA0012		x					x															x			L
L' Anguille River	8020205	-005	5B	44.1	UWLGR02		x					x				x	x	x									x			L
L' Anguille River	8020205	-004	5B	16.0	UWLGR01		x					x				x		x									x			L
L' Anguille River	8020205	-003	5B	16.8	e		x					x				x		x									x			L
L' Anguille River	8020205	-002	5B	1.8	e		x					x				x		x									x			L
L' Anguille River	8020205	-001	5B	19.7	FRA0010		x					x				x		x									x			L
Prairie Creek	8020205	-902	5B	12.8	FRA0035											x	x	x									x			L

Table IV-2 (cont.): Water Quality Limited Waterbodies (Category 5) – 303(d) List

LAKE NAME	HUC	RCH	PLNG SEG	Acres	MONITORING STATION	Designated Use Not Supported						Water Quality Standard Non-Attainment												Source of Contamination						
						FC	FSH	PC	SC	DW	AI	DO	pH	Tm	Tb	Cl	SO4	TDS	PA	Cu	Pb	Zn	Other	IP	MP	SE	AG	UR	UN	Priority
Saracen	11110207	D	3C	500.0	LARK026A	x																	PCB	x						L
Pickthorne	8020402	D	3B	350	LARK025A		x																UN						x	L
Blue Mountian	11110204	E	3G	2910	LARK028A+B		x								x											x				H
Swepco	11110103	B	3J	531	LARK009A		x																UN						x	L
Greenlee	8020304	D	4A	320	LWHI006A		x																UN						x	L
Frierson	8020302	C	4B	335	LWHI002A		x													x									x	L
Beaver - Upper	1101001	A	4K	1500	LWHI013B		x	x							x				x							x				H
Poinsette	8020203	C	5A	600	LMIS002A		x																UN						x	L

PART V GROUNDWATER ASSESSMENT

Introduction

Section 106(e) of the CWA specifies that each State monitor the quality of its groundwater resources and report results to Congress on a biennial basis in its State 305(b) report.

The current report format is derived in large part from the 1996 305(b) reporting guidance provided by the EPA primarily for uniformity in reporting by the States. Accordingly, this section of the report consists of (1) a summary of State groundwater protection programs and (2) a listing of the major sources of contamination in the State.

The EPA continues to encourage states to 1) work toward assessing all groundwaters of the State from various aquifers, 2) use prescribed table formats for consistency among all states, and 3) describe major changes in groundwater protection programs including legislative amendments and policy directives.

The Department has sampled all major fresh-water aquifers per the EPA goal of reporting groundwater quality for specific aquifers or hydrologic setting, and has begun reporting by individual aquifers within this report.

Because summarizing the assessment of the entire State's groundwater resources on a biennial basis is such a large and time-consuming task, the EPA has recommended reporting only on changes since the last hard-copy report. As such, the following is a combination of data from the previous report and new information since the last publication of the 2010 Arkansas Water Quality Inventory Report. Updated information has been inserted on activities from the last quarter of FY 2009 through the end of State FY 2011 (June 30, 2011), and reports on activities prior to April 1, 2006 have been omitted. Due to 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 information also provided in the last report.

Overview

Shallow fresh water aquifer systems are found throughout Arkansas, and supply an abundance of high quality groundwater for a wide range of uses including industrial, municipal, agricultural, and domestic. Groundwater is one of the most important water supply sources in Arkansas and accounts for approximately 60 percent of the total water use in the state. Most all of the surficial aquifers supply water of good to very good quality, ranging from calcium-bicarbonate to sodium-bicarbonate water types. Areas of poor water quality can result from both natural and anthropogenic effects. Natural sources of contamination are typically regional in extent and are related to water-rock interactions. Anthropogenic impacts are more localized and include both point and nonpoint sources of contamination. Nonpoint sources can affect larger areas, although contaminant concentrations typically are significantly lower than those resulting from point sources, and the contaminants typically are soluble, non-reactive species. Point sources of contamination often result in elevated levels of contaminants which exceed federal Maximum Contaminant Levels (MCLs); 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 1460 mg/L. Isolated areas of elevated chloride (as high as 1000 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 in isolated areas in the Paleozoic aquifer systems in northern Arkansas. Elevated arsenic concentrations are found in the Alluvial aquifer and range upwards to 70 µg/L. Arsenic concentrations exceed the MCL of 10 µg/L and appear to result from the reductive dissolution of iron oxides, which contain co-precipitated trace metals including arsenic. Elevated iron and manganese concentrations are ubiquitous throughout the State, in the Alluvial aquifer in eastern Arkansas and in the Paleozoic strata in north central Arkansas with the exception of the carbonate aquifers. Elevated iron and manganese 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 often required by various processes.

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. Point sources of contamination include landfills, underground storage tanks, leaking waste- and process-water holding lagoons, industrial facilities, military installations and petroleum storage and transfer operations. Although these potential sources of contamination range upwards to greater than ten thousand occurrences for hazardous waste generators and underground storage tanks, documented instances of offsite migration of contaminants are probably significantly less. However, costs for procuring an 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, thus 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 groundwater quality, but additionally in the protection of diminishing groundwater supplies in areas where agricultural, municipal and industrial needs have placed unsustainable demands on the production capacities of certain aquifer systems.

Groundwater in Arkansas occurs in two general geologic settings, represented by five major physiographic regions of the State: Ozark Plateaus, Arkansas River Valley, Ouachita Mountains, West Gulf Coastal Plain, and Mississippi River Alluvial Plain. The aquifer systems in eastern Arkansas (West Gulf Coastal Plain and the Mississippi River Alluvial Plain) are dominantly represented by alternating sequences of gravel, sand, silt, and clay, which form both confining layers and aquifers. The main aquifer systems are located in the Quaternary deposits (the Alluvial aquifer), the Cockfield Formation, the Sparta Formation, the Wilcox Group, the Nacatoch Sand, and the Tokio Formation (Table V-1). The Alluvial aquifer and the Sparta aquifer are the most important aquifers in eastern Arkansas, supplying more than 95 percent of the groundwater used in this region of the State. The thickness of the Alluvial aquifer ranges from approximately 50 to 150 feet, produces an average of 1600 gpm to irrigation wells, and is used mainly for irrigation. The Sparta aquifer 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.

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

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

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

(* denotes major aquifers)

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

<table>
<tr><th>ERA</th><th>SYSTEM</th><th>FORMATION</th><th>GEOHYDROLOGIC UNIT</th><th>GEOHYDROLOGIC SYSTEM</th></tr>
<tr><td rowspan="10">Paleozoic</td><td>Pennsylvanian</td><td>Atoka Formation
Bloyd Formation
Hale Formation</td><td rowspan="2"></td><td rowspan="2">Western Interior Plains Confining System</td></tr>
<tr><td rowspan="3">Mississippian</td><td>Pitkin Limestone
Fayetteville Shale
Batesville Sandstone
Moorefield Formation</td></tr>
<tr><td>Boone Formation
St. Joe Limestone Member</td><td>Springfield Plateau Aquifer</td><td rowspan="8">Ozark Plateaus Aquifer System</td></tr>
<tr><td>Chattanooga Shale</td><td>Ozark Confining Unit</td></tr>
<tr><td>Devonian</td><td>Clifty Limestone
Penters Chert</td><td rowspan="4">Ozark Aquifer</td></tr>
<tr><td>Silurian</td><td>Lafferty Limestone
St.Clair Limestone
Brassfield Limestone</td></tr>
<tr><td>Ordovician</td><td>Cason Shale
Fernvale Limestone
Kimmswick Limestone
Plattin Limestone
Joachim Dolomite
St. Peter Sandstone
Everton Formation
Smithville Formation
Powell Dolomite
Cotter Dolomite
Jefferson City Dolomite
Roubidoux Formation
Gasconade Dolomite
Van Buren Formation
Gunter Sandstone Member</td></tr>
<tr><td rowspan="3">Cambrian</td><td>Eminence Dolomite
Potosi Dolomite</td></tr>
<tr><td>Doe Run Dolomite
Derby Dolomite
Davis Formation</td><td>St. Francois Confining Unit</td></tr>
<tr><td>Bonneterre Dolomite
Regan Sandstone
Lamotte Sandstone</td><td>St. Francois Aquifer</td></tr>
</table>

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

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

ERA	SYSTEM	FORMATION
Cenozoic	Quaternary	Alluvium & Terrace Deposits
Paleozoic	Pennsylvanian	Boggy Formation Savanna Formation McAlester Formation Hartshorne Sandstone Atoka Formation Johns Valley Shale Jackfork Sandstone
	Mississippian	Stanley Shale
	Mississippian / Devonian	Arkansas Novaculite
	Silurian	Missouri Mountain Shale Blaylock Sandstone
	Ordovician	Polk Creek Shale Big Fork Chert Womble Shale Blakely Sandstone Mazarn Shale Crystal Mountain Sandstone Collier Shale

The greatest water quantity issue in Arkansas 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 both have historically provided abundant water, neither can sustain the current withdrawal rates indefinitely. Water levels in both aquifers have declined substantially across broad areas, and large cones of depression have developed in several regions. 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 propagates outward and many individual cones of depression can coalesce into larger cones, eventually forming a single large cone of regional scale. If pumping from the Alluvial and Sparta aquifers continues to exceed sustainable rates, water levels will continue to decline and eventually reach a level that water cannot be pumped at the rates needed to support all users.

Although the amount of water withdrawn annually from the Sparta aquifer is much less than what is withdrawn from the Alluvial aquifer, the coefficient of storage, or "storativity" that defines the amount of water released from an aquifer per unit volume is several orders of magnitude smaller than that of the Alluvial aquifer, thus a much larger volume of the Sparta is affected in producing the same volume of water as compared to the Alluvial aquifer. Consequently, extensive water-level declines have been observed in the Sparta aquifer, and the development of large cones of depression indicate that water is being withdrawn from the Sparta 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 increase in withdrawal rates occurring in many areas. This growth in observed withdrawal rates will result in acceleration of 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.

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

Groundwater Availability and Use

Each year, over 7,500 million gallons per day of groundwater is pumped from the State's aquifers. The greatest volume (7,023 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 Aquifer system (approximately 158 mgd), used for municipal, irrigation, and industrial purposes.

Groundwater use in Arkansas has increased by 100 percent since 1985. Increased demand on groundwater has resulted in water-level declines and water quality degradation in many areas of the State. This prompted the passage of Act 154 of 1991, which identifies critical groundwater areas in the State and authorizes regulation of usage. Classification of critical groundwater areas is based on certain criteria, including water levels below the top of a given formation (confined aquifer), saturated thickness of the formation less than 50 percent of the total formation thickness (unconfined aquifer), water-level declines of more than one foot per year over a five year period, and trends indicating degradation of water quality (ANRC, 2008). Recent policy changes place an increased emphasis on the achievement of sustainable yield of all the State's aquifers. Determination of sustainable yield is established by the ANRC and has been a long-term project in cooperation with the US Geological Survey (USGS) Arkansas Water Science Center in Little Rock.

In 1995, the Sparta aquifer was designated as a critical groundwater area by the ANRC in south Arkansas in a five-county area (Ouachita, Calhoun, Bradley, Columbia, and Union). In 1998, the ANRC designated an area encompassing Jefferson, Arkansas, Prairie, Lonoke and parts of Pulaski and White counties as a critical groundwater area for the Alluvial and Sparta aquifers. Priority study areas for present and future analyses include the Alluvial and Sparta aquifers in parts of northeastern and southeastern Arkansas, including the Cache and St. Francis study areas in northeast Arkansas and the Boeuf-Tensas study area in southeast Arkansas.

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

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

The ANRC is considering formal recommendation of sustainable yield for the Sparta/Memphis Aquifer in eastern and southern Arkansas. This process will build on the groundwater flow model sustainable yield estimates produced through a cooperative effort with the USGS Water Science Center in Little Rock.

Groundwater Quality Protection and Restoration

There are many groundwater protection programs within the State that include both regulatory and voluntary groundwater contamination prevention activities from both point sources and nonpoint sources. Point source prevention programs are almost entirely regulatory programs and are administered by the Department, while the majority of nonpoint sources are related to agriculture and other land-use activities and commonly include joint efforts by several agencies.

Regulated Storage Tanks Division (ADEQ)

The Regulated Storage Tanks (RST) Division at the Department has program responsibility for implementing the federal underground storage tank (UST) program in Arkansas, and for the cleanup of releases from both regulated USTs and aboveground storage tanks (ASTs).

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

Completion of its first three-year inspection cycle on all UST facilities. The Energy Policy Act of 2005 had a significant impact on several RST program areas, especially the three-year inspection cycle, the requirement for secondary containment on new or replaced USTs and piping, and the regulated substances delivery prohibition for noncompliant UST systems. Additionally, a training course, study materials, and exam were developed and implemented in 2010 for the required certification of UST operators.

Claims for reimbursement of corrective action costs from the Arkansas Petroleum Storage Tank Trust Fund continue to increase. In October 2005, the Petroleum Environmental Assurance Fee was increased to 3/10ths of one cent per gallon of motor fuel or distillate special fuel purchased in or imported into the State in order to help ensure the fund stays financially sound. The trust fund balance as of September 30, 2011, was $19.4 million, with total estimated obligations (corrective action and third-party) of $11.5 million.

The number of facilities with active storage tanks has shown a slight increase in spite of the economic conditions of the past few years. As of October 18, 2011, there were 13,033 regulated storage tanks located at 5,607 active facilities across the State.

The pollution prevention aspects of the federal UST program are demonstrating some level of success. The number of confirmed releases peaked in the third quarter of 2001, and has been slowly declining since that time with a significant operational compliance rate of 58 percent as of September 30, 2011.

Underground Injection Control Program (ADEQ)

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

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

There are 14 Class I injection wells in the State. These wells inject into underground saline fluid-containing formations at depths ranging from 2500’ to 8800’ below ground surface. There are four hazardous waste injection wells and ten non-hazardous waste injection wells currently in existence in Arkansas. Five of the Class I wells are “shut-in” or temporarily abandoned and not currently injecting. No significant noncompliance or similar violations occurred. All operating wells passed their annual mechanical integrity testing (MIT) requirements. One non-hazardous waste injection well was drilled at the Great Lakes Solutions/A Chemtura Company South Plant in March 2010.

Solid Waste Management Division (ADEQ)

The Department’s Solid Waste Management Division (SWMD) is responsible for regulating disposal of non-hazardous solid waste and handling, processing, recycling, and marketing of recycled materials. Arkansans are provided with environmentally safe options for solid waste collection and disposal through municipal solid waste landfills, construction landfills, industrial landfills, transfer stations, waste-tire collection facilities, composting facilities and material recycling centers. Department SWMD staff oversee implementation of Regulation 22 solid waste management rules. This regulation governs the State’s municipal, industrial, and commercial solid waste programs and was established to protect human health and the environment.

Landfills are a potential point source for groundwater contamination. To reduce groundwater contamination potential, all Arkansas landfills are required to:

1) Be built five feet above the seasonal high groundwater level and
2) Have liners to reduce or stop leachate from percolating through the bottom and sides of the landfill.

In addition, landfills which are considered to have a higher potential to impact the environment are required to:

1) Collect their leachate and treat it prior to discharge and
2) Perform groundwater monitoring around the landfill.

These landfills include all municipal solid waste landfills (Class 1) and certain private industrial landfills, depending on the type of waste that is disposed at the private facility. If groundwater around the landfill exceeds MCLs, corrective action is required.

The SWMD investigates groundwater contamination caused by older, closed landfills. A Post-Closure Trust Fund contains monies to pay for any corrective action needed at the landfills after closure. From 2007 through 2011, Post-Closure Trust Fund was used to characterize two landfills in northwestern Arkansas that were closed prior to current landfill standards: C & L Landfill and Parson's Landfill. Both landfills are located in Washington County, C & L Landfill is south of Fayetteville, while Parson's Landfill is east of Springdale. The characterization included sampling of groundwater, leachate, surface water, and landfill gas at the landfills to determine current conditions. Final site assessment and decision on additional closure activities for each site will be made based on sampling and characterization results

Hazardous Waste Division (ADEQ)

The following items are regulatory or policy changes that may impact sites within the State requiring groundwater monitoring, groundwater investigations, and groundwater remediation under the Department's Hazardous Waste Program.

Regulation No. 23

Regulation No. 23, Hazardous Waste Management, was recently updated, effective September 26, 2011, to include revisions to (1) Requirements for Trans-boundary Shipments of Hazardous Wastes Between OECD Member Countries, Export Shipments of Spent Lead-Acid Batteries, Submitting Exception Reports for Export Shipments of Hazardous Wastes, and Imports of Hazardous Wastes, and (2) a Hazardous Waste Management System Identification and Listing of Hazardous Waste Final Exclusion to delist specific wastes produced at the Tokusen, Inc. plant in Conway, which otherwise would be considered F006 hazardous wastes.

Regulation No. 30

Regulation No. 30, The Arkansas Remedial Action Trust Fund Hazardous Substance Site Priority List, will be proposed to be updated in December 2011. Four sites are proposed for deletion. The changes are expected to be effective May 2012.

Sites Proposed for Delisting

Baird Manufacturing, Clarendon, Monroe County
Dana Minton, Alexander, Saline County
I Easter, Pine Bluff, Jefferson County
Valueline 10th Street, Arkadelphia, Clark County

Regulation No. 32

Regulation 32 was amended to establish cleanup standards for clandestine drug laboratories on April 25, 2008; effective May 26, 2008. No additional changes have been proposed for this regulation.

Department Groundwater Remediation Level Interim Policy and Technical Guidance

The Department has developed an interim Policy for the establishment of groundwater remediation requirements for contaminated sites. This policy will apply to Divisions responsible for the oversight of groundwater remediation within the Department. The purpose of this policy is to establish consistent methods for establishing groundwater remediation levels regardless of the media Division having principal responsibility for the action.

Until a final regulation is promulgated by the Arkansas Pollution Control and Ecology Commission that is specific to the establishment of groundwater remediation levels, such levels will be established on a case-by-case basis.

Elective Site Cleanup Program

The Department administers an Elective Site Cleanup Program that allows responsible parties to enter into an agreement with the Department to govern the cleanup of sites. The Elective Site Cleanup Program does not offer a release of liability but does offer participants a means to address historic contamination on their site without penalty and with known objectives. The Department is working to promote the Elective Site Cleanup Program in order to maximize cleanups of sites within the State.

Groundwater Contamination Prevention Programs

Although the objectives of all groundwater protection programs are to protect and preserve groundwater quality, early legislation was primarily 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 groundwater contamination. New regulatory programs focused on stricter controls aimed at preventing releases from regulated facilities. Throughout the 1990s, there has been an increasing amount of effort and funds expended toward voluntary programs which strive to protect existing groundwater quality through outreach and assistance programs.

Wellhead Protection Program (Arkansas Department of Health)

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

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

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

One source water protection activity coordinated by the Arkansas source water protection program is technical review and comment on permitting actions of other agencies and organizations to assess potential adverse effects on drinking water sources. This process, originally intended to protect surface water sources, results in the review and tracking of various permitting activities including but not limited to NPDES permits, land application permits, and permits associated with oil and gas drilling and disposal of drilling fluids. Currently approximately 300 NPDES permits and approximately 100 land application permits are reviewed by the source water protection staff yearly. Permit reviews associated with oil and gas drilling have increased substantially to an approximately 1,400 permit reviews per year due to the escalating activity in the Fayetteville Shale gas play.

Technical assistance with proper siting and design of public water supply wells is another important mandate of the WHPP. Wellhead Protection staff geologists review over 40 proposed well designs and analyze drill cuttings for about 10 wells each year and produce detailed construction recommendations and maps for district staff use for each proposal.

Compiling and maintaining a database of well information and other data has long been an integral part of the program, which supports various aspects of the Health Department's PWSSP. Comprehensive hydrologic information is presently available for over 1,000 community public water supply wells and over 600 non-community public water supply wells. These data are often used by other agencies and organizations as well.

The success of the source water protection program is measured by the number of Community Water Systems (CWSs) and the population served by those CWSs that have met the criteria set forth in the state's definition of "Substantial Implementation." Arkansas defines "Substantial Implementation" as any CWS that has a Source Water Program (SWP) in place that includes a management team, a delineation (SWAP or WHPP delineation), a PSOC inventory, and one of the following control measures/management strategies: (1)

SWP/WHPP ordinance/resolution, or (2) any two of the following: SWP Emergency/Contingency plan, public outreach program, drinking water protection signs, and/or any other control measure/management strategy deemed acceptable by the State. Currently Arkansas's reporting numbers exceed annual targets established by EPA Region 6.

Water Well Construction Commission

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

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

Act 855 of 2003 (SB 702) provides a means of holding persons who violate Arkansas law regarding water well construction accountable for their actions. It requires proper training and licensing for water well construction, and specifies minimum bond amounts to protect well owners. Water well contractors who continuously violate Arkansas law requiring proper registration and training 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 it cannot be shown why the subject property should not be confiscated, it 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.

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Groundwater quality monitoring includes ongoing ambient monitoring, short-term research-oriented monitoring, and mandated monitoring at regulated sites. Availability of data is dependent on the monitoring goals and ranges from hard-copy reports and/or journal articles to publicly accessible computer storage formats such as the EPA's STORET database. Comparison of data from the various sources is difficult because of the differences in parameters, laboratory instrumentation and methods, and reporting criteria.

Ambient Groundwater Quality Monitoring

Ongoing ambient monitoring is performed primarily by two organizations: the Department and the USGS. Ongoing monitoring takes place at numerous Department-regulated facilities throughout Arkansas. 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 ADH provides another source of data. The ADH monitors approximately 1200 wells every three years for inorganic, organic (including pesticide, herbicide, SOCs, VOCs, etc.), and radiochemical contaminants. Total Coliform Rule requires sampling on a monthly basis, with the number of samples dependent on the population size. Nitrate monitoring is conducted on a yearly basis unless a sample greater than or equal to 50 percent of the MCL triggers the need for increased frequency. Additionally, the Disinfection Byproduct Rule requires monitoring for trihalomethanes and haloacetic acids, byproducts of the disinfection process, on a quarterly or annual basis, with the number of samples dependent on the type of source and population served by the system.

Raw water sampling is conducted under existing SDWA rules to detect microbial contaminants for groundwater 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 for *E. coli* has been implemented on a monthly basis for at least 12 months to establish baseline conditions for selected wells in hydrologically sensitive aquifers which may be at risk from sources of viral contamination (Groundwater Rule). Raw water sampling has been implemented for surface water sources and wells that have been determined to be directly influenced by surface water and are at risk of contamination with surface water pathogens (Long Term 2 Enhanced Surface Water Treatment Rule). This sampling will include monthly analysis of raw water for *E. coli* and/or cryptosporidium oocysts. Finally, monthly raw water sampling for TOC has been implemented for certain surface water sources (Disinfection Byproduct Rule).

United States Geological Survey

The USGS has 25 master wells throughout the State that are sampled every five years. Other wells are utilized for water quality sampling, but are sampled for special investigations and do not provide long-term data for trend analyses. The data derived from water quality investigations are presented in reports, which are easily obtainable at the local or national level or online at http://ar.water.usgs.gov/; data also are available in downloadable tabular or graphic format on the USGS NWISWeb, see http://waterdata.usgs.gov/ar/nwis/gw/. The USGS, in cooperation with the ANRC, additionally monitors 100 wells in the Sparta aquifer and 100 wells in the Alluvial aquifer for chloride and conductivity on a 3-year rotational basis, and 50 wells in both the Sparta and Alluvial aquifers for conductivity on a 1-year rotational basis. Although limited in the number of constituents, the relatively large number of wells provides a means of documenting general water-quality trends over time, through the plotting and comparison of isopleth maps and the use of statistical programs.

Short-Term Water Quality Monitoring (Special Investigations)

An extensive groundwater quality database has been developed as a result of numerous investigations primarily by the U of A at Fayetteville, the USGS, and the Department. 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 groundwater investigative reports for different areas of the State. These investigations are a valuable source of groundwater 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.

Arkansas Department of Environmental Quality

The Arkansas Ambient Groundwater Monitoring Program (Program) was begun in 1986 to monitor overall groundwater quality in the State. The Program consists of twelve monitoring areas throughout Arkansas (Figure V-1). The monitoring areas were selected to gather water quality data from various aquifers in representative areas of the State and evaluate potential impacts from multiple land uses. The monitoring areas are sampled on an approximate three-year basis.

The monitoring areas are affected by agricultural, industrial, or a combination of both practices. Potential impacts from anthropogenic sources include organic and inorganic compounds. Additionally, Comprehensive Environmental Response, Compensation, and Liability Act facilities, RCRA facilities, MSW landfills, and underground storage tank sites potentially threaten or have adversely affected groundwater in the monitoring areas.

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

Figure V-1: Arkansas's Groundwater Monitoring Areas

Athens Plateau Monitoring Area

The Athens Plateau Monitoring Area in southwest Arkansas includes Paleozoic rocks of the Ouachita Mountains physiographic region and Cretaceous rocks and Quaternary deposits of the West Gulf Coastal Plain physiographic province. The Paleozoic and Cretaceous aquifers within these regions are new additions to the groundwater monitoring network. Addition of this monitoring area serves to expand the knowledge of baseline groundwater quality in this area and determine the potential impacts of the agricultural industry to groundwater. The agricultural industry in this region includes extensive swine, poultry, and cattle operations. Currently, the monitoring area includes Howard and Pike counties and was first sampled in 2004. A total of 25 wells and one spring were sampled during the initial sampling event. A total of 23 groundwater wells and one spring were sampled during the most recent sampling event in 2008.

The samples from the northern part of the study area along the southern margin of the Ouachita Mountains were obtained from wells in the Devonian to Pennsylvanian Arkansas

Novaculite, Stanley Shale and Jackfork Sandstone. Samples taken in the southern part of the study area within the northern part of the West Gulf Coastal Plain were obtained from the Cretaceous Tokio Formation and Quaternary (Pleistocene and Holocene) deposits comprising the Alluvial aquifer. The majority of municipalities within the two-county area obtain their drinking water from surface sources, thus few municipal wells are available for sampling. However, many domestic and livestock wells exist which will enable future sampling from additional Cretaceous formations within the study area. Information related to the sampling sites and their locations is presented in Appendix B (Table B-19).

Water quality in the study area is generally good. Two of 24 samples, one from a well in the Stanley Shale and one from a spring, exceeded the MCL for nitrite+nitrate (10 mg/L) at 15.1 mg/L and 11.1 mg/L, respectively. Two additional wells in the Stanley Shale had nitrite-nitrate concentrations of 8.20 mg/L and 5.46 mg/L. The nitrite+nitrate concentrations in the remainder of the samples were well below 1.0 mg/L. Chloride concentrations were notably highest in the Alluvial aquifer, particularly the Quaternary alluvium, and ranged from 30.7 to 131 mg/L in three of the four samples from this interval. Four samples exceeded the secondary (SMCL) for iron (300 µg/L), and iron concentrations ranged from <20.0 to 3,810 µg/L. SMCLs are unenforceable federal guidelines regarding taste, odor, color and other aesthetic (cosmetic) characteristics of drinking water. Ten samples exceeded the SMCL for manganese (50 µg/L). Six of these exceedances were in samples derived from the Stanley Shale. Manganese was detected in all of the Athens Piedmont Plateau samples and concentrations ranged from 0.810 µg/L to 569 µg/L. TDS concentrations exceeded the SMCL of 500 mg/L in one of the 24 samples. Arsenic was detected in only three of 24 wells at concentrations ranging 0.790 µg/L to 1.60 µg/L, with no exceedances of the MCL of 10 µg/L. Selected descriptive statistics are presented in Appendix B (Table B-20).

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 River Alluvial Plain physiographic region. The Alluvial and Sparta aquifers provide 100 percent of community water needs. The primary uses are drinking water and crop irrigation. Monitoring in this area was initiated during FY 1989 because of elevated chloride levels and potential impacts from pesticides to the Alluvial aquifer. A total of 29 groundwater wells from the Alluvial aquifer were sampled during the most recent sampling event in June, July and August, 2011.

Chloride concentrations ranged from 13.8 to 619 mg/L, and concentrations in seven wells exceeded the 250 mg/L SMCL. Iron concentrations exceeded the SMCL of 300 µg/L in 27 of the 29 wells, and manganese concentrations exceeded the SMCL of 50 µg/L in 28 wells. TDS concentrations exceeded the SMCL of 500 mg/L in 22 of the 29 wells. Arsenic was detected in all 29 samples at concentrations ranging from 0.88 µg/L to 7.90 µg/L, with no exceedances of the MCL (10 µg/L). Pesticide analyses were last performed on 27 irrigation well samples in FY 2005. At that time, the following three pesticides were detected in three separate wells: methyl-parathion, metribuzin, and molinate. Information related to the wells and a summary of analytical data are presented in in Appendix B (Tables B-1 and B-2).

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 River Alluvial Plain physiographic region. 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. Groundwater monitoring in the Chicot monitoring area began FY 1990 and originally consisted of ten wells.

The number of sampled wells was increased during FY 1997 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 in Appendix B (Table B-3). Chloride was detected in 20 of 26 wells at concentrations at or above the recommended SMCL of 250 mg/L. Iron concentrations exceeded the SMCL of 300 µg/L in 24 of 26 wells. TDS concentrations also exceeded the SMCL of 500 mg/L in 24 of 26 wells. Manganese was detected in 24 of 26 wells at concentrations above the SMCL of 50.0 µg/L. Selected descriptive statistics are listed in Appendix B (Table B-4). In addition to the routine analyses, pesticide analysis was conducted on selected samples that were adjacent to active crop-growing areas. Bentazon and p-p'-DDT were detected in two different wells at levels below their Heath Advisory Levels (HALs). The HAL concentration of a chemical in drinking water is a value that, based on the available data, is virtually certain not to cause adverse human health effects if consumed over a lifetime.

An extensive investigation was initiated in 2000 to evaluate the source and extent of saltwater intrusion in Chicot County, Arkansas. A general background and problem statement detailing past studies and preliminary findings is located in Kresse, et al. (2000). By 2003, 249 wells had 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 Formation and one monitoring well was completed in the Sparta aquifer during the spring and summer of 2000. Personnel from the USGS provided electrical logs of 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.

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 West Gulf Coast Plain physiographic region. Three aquifers, the Cockfield, Upper Sparta (Greensand) and Lower Sparta (El Dorado), are 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. Potential threats to groundwater, particularly the shallow Cockfield aquifer, are numerous. This area is highly industrialized: oil and gas production; bromine extraction, production, and refining; light manufacturing; and food processing. Groundwater monitoring in the El Dorado Monitoring Area began in FY 1987 with the most recent sampling event conducted during the second and FY 2008.

Groundwater samples were obtained from eleven wells in the El Dorado aquifer, five wells in the Greensand aquifer and eight wells in the Cockfield aquifer. In addition to the routine parameters, the samples from the Cockfield aquifer were analyzed for VOCs, SVOCs, Pesticides and PCBs. A summary of the sampling sites and their locations is presented in Appendix B (Table B-5). Iron was detected in five of the 24 wells at concentrations above the SMCL of 300 µg/L and manganese was detected in three wells at concentrations above the SMCL of 50.0 µg/L. Selected descriptive statistics are presented in Table B-6. The VOC 2,2-dichloropropane was detected at very low concentrations in two wells. Three phthalate SVOCs were detected (di-n-butyl-phthalate, butyl-benzyl-phthalate, and bis(2-ethylhexyl)phthalate). Phthalates are manufactured chemicals which are added to plastics, paint, glue, hair spray, and other household products. They are commonly found in the environment and no harmful effects have been found in humans. They are also common laboratory contaminants. Additional SVOCs which were detected include 2,4-dimethyl phenol, 2-nitrophenol, 4-chloro-3-methylphenol, phenol, and acetophenone. With the exception of the phthalate compounds and phenol, the VOCs and SVOCs detected in 2008 have not been detected in previous sampling events and may have been detected now due to the increasingly low detection limits of the laboratory equipment. Currently, there are no drinking water standards for the VOCs and SVOCs detected. Pesticides and PCBs were not detected in any of the El Dorado groundwater samples.

Hardy Monitoring Area

The Hardy Monitoring Area is located in northeast Arkansas in Sharp and Fulton counties. The FY 2008 sampling event included 24 wells ranging in depth from 150 to 1200 feet and two springs (Table B-7). The area was originally chosen because of the lack of water quality data from the Lower Ordovician aquifers along the eastern end of the Ozark Plateaus physiographic region. The wells produce water from various formations including the Cotter and Jefferson City Dolomites and the Roubidoux Formation.

Generally speaking, the groundwater quality on the Hardy monitoring area is good. The water type is calcium plus magnesium bicarbonate, in which concentrations of magnesium and calcium, expressed as equivalent weights, are approximately equal in virtually every sample. Sodium concentrations were less than five 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. The average TDS concentration was 295 mg/L. The four deep wells had a lower mean nitrite+nitrate concentration (~ 0.22 mg/L) than the overall mean for all wells (0.845 mg/L). Average TDS, nitrogen and other parameters closely resembled the Ozark aquifer samples from the Omaha Monitoring Area. Iron was not detected in any of the groundwater samples and the maximum manganese concentration was 2.6 µg/L, well below the SMCL (50 µg/L). A summary of the data from the 2008 sampling event is presented in Table B-8.

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 River Alluvial Plain physiographic region. The Alluvial aquifer and the Memphis aquifer (northern extension of the Sparta) are the primary groundwater sources in this area. One of the Jonesboro sampling locations is in the deeper Wilcox Formation. The monitoring area was selected because of large populations using groundwater, exposed condition of the municipal wells, and extensive drawdown in the Alluvial aquifer. This area of water level 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 most recently sampled in August, 2009. Information related to the wells sampled for the Jonesboro Monitoring Area is located in Table B-9.

Groundwater ranged from a calcium-bicarbonate to a strongly sodium-bicarbonate water type, with an intermediate mixed water type containing approximately equal portions of calcium, sodium and magnesium. This suggests a gradual chemical evolution from a calcium dominated water type in the shallow Alluvial aquifer to sodium dominated water at depth within the Memphis aquifer. TDS concentrations ranged from 84 to 1110 mg/L, with four of the 17 samples exceeding the SMCL of 500 mg/L. Iron was detected in 11 of the 17 samples at concentrations ranging from 25 to 6940 µg/L, with six of these detections exceeding the SMCL of 300 µg/L. Manganese was detected in all of the 17 samples at concentrations ranging from 0.880 to 1260 µg/L, with six of these detections exceeding the SMCL of 50 µg/L. Nitrite+nitrate was detected in ten samples at concentrations ranging from 0.274 to 2.17 mg/L. A summary of the groundwater analyses is presented in Table B-10.

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 River Alluvial Plain physiographic region. Groundwater 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 groundwater for all of its water needs. Pesticides are the primary potential contaminants in the area. Groundwater samples were obtained from 16 wells in 2010 (Table B-11).

Iron was detected in all 16 wells at concentrations ranging from 1490 to 30,000 µg/L, all which exceed the SMCL of 300 µg/L. Manganese was detected in all wells at concentrations above the SMCL, and ranged from 243 to 2350 µg/L. TDS concentrations ranged from 139 to 489 mg/L, with no exceedances of the SMCL. Selected descriptive statistics are presented in Table B-12.

Frontal Ouachita Monitoring Area

The Frontal Ouachita Monitoring Area is located in central Arkansas within Pulaski and Saline counties in the Ouachita Mountains physiographic region. Strata within this monitoring area consist of Paleozoic sandstones, shales, novaculites and cherts. These strata were intensely folded and faulted during the late Paleozoic into generally east-west trending anticlines and synclines, and imbricate strike ridges and valleys. Typically, novaculite or sandstone forms prominent ridge tops, while intervening valleys are composed mainly of shales. Sixteen wells and three springs were sampled during the most recent sampling event (2010). Laboratory analyses included inorganic chemistry and nutrients.

Paleozoic strata exposed at the surface include formations ranging in age from Ordovician through Mississippian. Twenty-two of the twenty-three wells are completed in bedrock and are mostly uncased and likely receive water from more than one formation. Because of the structurally complex nature of the area geology, each sampling location was assigned to the formation present at the surface. As such, 12 samples were taken from the Ordovician Womble Shale, two from the Ordovician Bigfork Chert, one from the Devonian to Mississippian Arkansas Novaculite, one from the Mississippian Stanley Shale, one from the Bigfork Chert/Arkansas Novaculite contact, and one from a spring at the Ordovician Bigfork Chert/Polk Creek Shale contact. The remaining two wells are completed in Quaternary terrace deposits of the Alluvial aquifer. Information related to the wells and springs sampled for this monitoring area is located in Table B-21.

Overall groundwater quality was good. Iron was detected in nine of the 25 samples at concentration ranging from 21.1 to 1540 µg/L, with four exceedances of the SMCL (300 µg/L). Manganese was detected in all 19 samples at concentrations ranging from 0.41 to 150 µg/L, with four exceedances of the SMCL (50 µg/L). Arsenic was detected in 7 of 19 samples at concentrations ranging from 0.52 to 3.67 µg/L, thus all were below the MCL of 10 µg/L. Nitrite+nitrate was detected in 11 of the 19 samples at concentrations ranging from 0.060 to 8.15 mg/L, with no exceedances of the MCL (10mg/L). A number of the nitrite+nitrate detections are located where septic systems are used exclusively, livestock is present, and chicken houses are present. Selected descriptive statistics are presented in Table B-22.

Omaha Monitoring Area

The Omaha Monitoring Area encompasses the northwest quarter of Boone County and is located in the Ozark Plateaus physiographic region. Groundwater is obtained from the Springfield Plateau and Ozark aquifers, which are in limestone and dolostone formations, respectively. Groundwater monitoring was initiated to evaluate potential impacts in an area of karst geology. Potential contaminant sources include abundant livestock farms and USTs. In addition, groundwater contamination was documented within the monitoring area at a former wood treatment plant; a listed Superfund site. Groundwater samples were obtained from ten springs and eighteen wells in 2010. All of the springs discharge from the Springfield Plateau aquifer. All but one of the wells penetrates the Ozark aquifer. A summary of the sampling sites and their locations is in Table B-13.

The 2010 analytical data for the samples from the Springfield Plateau aquifer are presented in Table B-14a . Overall groundwater quality was good. Iron was not detected in any of the Springfield Plateau aquifer samples. Manganese was detected in 4 springs at low level concentrations ranging from 0.35 to 2.38 µg/L, all below the SMCL of 50 µg/L. Nitrite+nitrate was detected in all Springfield Plateau aquifer samples at concentrations ranging from 1.13 to 6.70 mg/L, all below the MCL of 11 mg/L. Arsenic was detected in eight samples at concentrations ranging from 0.52 to 0.72 µg/L, which are well below the MCL of 10 µg/L.

The 2007 analytical data for the samples from the Ozark aquifer are presented in Table B-14b. Overall groundwater quality was good. Iron was detected in only two Ozark aquifer sample at concentrations of 34.6 and 29.4 µg/L which are below the SMCL (300 µg/L). Manganese was detected in 14 of 17 samples at concentrations ranging from 0.39 to 5.87 µg/L, which are below the SMCL (50 µg/L). Nitrite+nitrate was detected in 15 of the Ozark aquifer samples at concentrations ranging from 0.016 to 8.30 mg/L, all below the MCL of 11 mg/L. Arsenic was detected in 9 Ozark aquifer samples at concentrations ranging from 0.54 to11.5 µg/L, with one sample exceeding the MCL od 11 mg/L.

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 West Gulf Coast Plain physiographic region within the recharge area of the Sparta aquifer; the second most heavily used aquifer in the State. In addition, a portion of the Cockfield aquifer recharge area is located in the southwestern portion of this monitoring area. Groundwater is the primary water source used for domestic, municipal, and industrial purposes. Groundwater samples were obtained from 11 shallow to moderately deep wells and one spring in 2009. 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 B-15.

Selected descriptive statistics for the Ouachita County monitoring area are presented in Table B-16. Overall, groundwater quality in this monitoring area is good, with TDS concentrations ranging from 31 to 153 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 7 of 12 samples at concentrations ranging from 24.2 to 3350 µg/L, with six detections above the SMCL of 300 µg/L. Manganese was detected in all of the Ouachita County samples at concentrations ranging from 1.85 to 54.6 µg/L, with one of the 12 samples above the SMCL of 50 µg/L. Nitrite+nitrate was detected in 9 of the 11 samples at concentrations ranging from 0.014 to 5.18 mg/L with no exceedances of the MCL. Arsenic was not detected in any of the Ouachita County groundwater samples.

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 West Gulf Coast Plain and the Mississippi River Alluvial Plain physiographic regions. Groundwater 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 most recent sampling event occurred during May and August 2011, when a total of 16 wells were sampled. A summary of the sampling sites and their locations is in Table B-17.

Selected descriptive statistics for the Pine Bluff monitoring area are presented in Table B-18. The groundwater 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 all 16 Pine Bluff wells at concentrations ranging from 10.0 to 38,500 µg/L, with 13 of the detections exceeding the SMCL (300 µg/L). Manganese was detected in all 16 wells at concentration ranging from 15.0 to 2600 µg/L, with 9 detections exceeding the SMCL (50 µg/L). Nitrite+nitrate-nitrogen was detected in one well at a concentration of 0.060 mg/L, well below the MCL. Arsenic was detected in three of the Pine Bluff wells, also at concentrations well below the MCL. VOC analysis was conducted on the four alluvial wells. Methylene chloride, a common laboratory contaminant, was the only VOC detected.

North Central Monitoring Area

The North Central Monitoring Area includes portions of the counties of Conway, Van Buren, Cleburne, White, and Faulkner. The monitoring area lies primarily in the Arkansas River Valley physiographic region. Groundwater in the area is withdrawn from the Pennsylvanian Atoka Formation or Hale Formation which lie above the Fayetteville Shale. The North Central Arkansas monitoring area was developed in response to the dramatic increase in shale gas development. The Department has received numerous environmental complaints related to the Fayetteville Shale gas play. The majority of the area is now served by the Community Water System which derives water from Greers Ferry Lake. In much of the monitoring area domestic water wells have been replaced by the public water supply as have most of the smaller community water systems. This made locating groundwater wells which are still functional difficult. The North Central Arkansas monitoring area is the newest of the ambient groundwater monitoring areas; it was initially sampled in May through November 2010. A total of 64 springs and wells were sampled during the initial sampling event. During subsequent sampling events, some of the shallow springs were dropped and some new wells were added. Over the long term, the North Central monitoring area will be pared down to a smaller core set of sampling sites. A summary of the sampling sites and their locations is presented in Table B-23.

Selected descriptive statistics for the North Central Arkansas monitoring area are presented in Table B-24. The groundwater quality was generally good. Iron was detected in 46 of the 64 North Central Arkansas samples at concentrations ranging from 20.7 to 11,300 µg/L, with 25 detections exceeding the SMCL (300 µg/L). Manganese was detected in all 64 sample locations at concentration ranging from 0.91 to 2800 µg/L, with 45 detections exceeding the SMCL (50 µg/L). Nitrite+nitrate-nitrogen was detected in 18 of the 64 samples at concentrations ranging from 0.020 to 6.40 mg/L, all below the MCL. Arsenic was detected in 17 of the 64 samples at concentrations ranging from 0.51 to 18.1 µg/L, with only one detection above the MCL. Chloride and TDS are considered to be the primary indicator compounds of potential impacts from deeper groundwater zones and gas drilling. Chloride was detected in all 64 samples at concentrations ranging from 1.1 to 105 mg/L none of which exceed the SMCL of 250 mg/L. TDS was also detected in all 64 samples at concentrations ranging from 10 to 644 mg/L. There were only four exceedances of the SMCL of 500 mg/L for TDS. Three of the exceedances were in springs located in Heber Springs Park which are highly mineralized springs assumed to tap deeper groundwater zones. The fourth exceedance is from a domestic well which is artesian and is also assumed to tap a deeper groundwater zone. Based upon the results of the limited list of parameters analyzed from the 64 groundwater sampling locations in the North Central Arkansas monitoring area, there do not appear to be any apparent impacts from the Fayetteville Shale gas drilling or fracturing.

Short-Term Water Quality Monitoring (Special Investigations)

An extensive groundwater quality database has been developed as a result of numerous investigations primarily by the U of A at Fayetteville, the USGS, and the Department. Most of this information is also available in hard-copy as reports and publications. These investigations are a valuable source of groundwater quality data. However, some of these investigations may have been performed at sites with known sources of contamination and do not represent ambient or background water quality.

United States Geological Survey

During FY 2004 through FY 2009, the USGS Arkansas Water Science Center (WSC) was involved in several projects related to the assessment of groundwater quantity and quality issues. Many of the projects involved cooperative efforts with other state agencies and are described below.

Groundwater data collection activities in the State continue with high visibility resulting from increasing public and agency concerns over drawdowns in the Sparta-Memphis and Alluvial aquifers. Continuing USGS groundwater programs include: a cooperative program to monitor groundwater levels of Arkansas's seven major aquifers on a rotating basis, collection of conductance samples, master wells groundwater quality program, operation of four continuous groundwater recorders, and 21 real-time stations, geophysical logging of wells and conducting one aquifer test on a yearly basis. The Arkansas WSC collected specific conductance from 50 wells, water level measurements in over 300 Alluvial aquifer wells, and 330 water levels from the Sparta-Memphis aquifer as part of the 2-year rotating groundwater program.

A four-year study of water quality in the Buffalo River watershed is being completed this FY. More than 60 spring samples were collected and analyzed and LIDAR data were collected over select subwatersheds to characterize water quality and determine any control or relation to karst development. A detailed geologic map also was generated for four quad map areas.

Recent USGS findings at Hot Springs National Park (HSNP) show the existence of a geothermal system east of the park boundary. Hydrologic behaviors that highlight the vulnerability of the thermal water resource of HSNP to changes resulting from human activities were observed. These activities included urban and suburban development, expansion of infrastructure, and building and extension of major roadways. Currently, construction of the Highway 270 east bypass is of great concern. Activities associated with highway construction and land use changes may affect the hot springs of HSNP by: (1) causing changes in water quality that recharges the system by introduction of contaminants associated with construction and new land-use activities; and (2) causing changes to the physics of the flow system by opening or closing fracture conduits, and changing surface recharge characteristics by introducing impervious surfaces; removing soil, regolith, and rock strata; and changing vegetation cover type and density. The USGS completed a four-year study to determine connectivity of the thermal springs flow paths with the area of the proposed highway alignment and potential effects of highway construction and land use change on the springs, finding that proposed construction could have minimal effects on the springs if appropriate construction techniques are applied, whereas any land development that may follow the construction of the highway could have significant impacts. (http://pubs.usgs.gov/sir/2009/5263/SIR2009-5263.pdf).

Three groundwater flow and conjunctive use optimization models (two alluvial and one Sparta) have been completed. Each of the optimization models provides estimates of "sustainable yield" based on constraints that are consistent with criteria used by the ANRC. ANRC is extremely interested in the results of all three of these modeling studies and is funding a continuing "modeling technical assistance" project that will assist ANRC personnel at public meetings, prepare and conduct presentations, publish fact sheets, and run additional scenarios. The models have helped ANRC understand how redefining certain constraints may affect sustainable yield from the aquifers and rivers, and how the aerial distribution of withdrawals contributes to sustainable yield. Recent applications of the groundwater flow model for the Alluvial aquifer north of the Arkansas River were published and show the effect of various water-use scenarios for two municipalities in Lonoke County (http://pubs.usgs.gov/sir/2006/5275/pdf/SIR2006-5275.pdf, and http://pubs.usgs.gov/sir/2007/5030/). In addition, several scenarios designed to assess various pumping and stream flow constraints on optimized sustainable yield estimates have been simulated. The north alluvial model was validated in 2009 with data up to 2005 and a report has been published (http://pubs.usgs.gov/sir/2009/5040/pdf/SIR2009-5040.pdf).

Calibration of a groundwater flow model of the Ozark Plateaus aquifer system of the Tri-state mining district was completed in 2009. The model simulates groundwater discharge to streams and springs, and flow through the Springfield Plateau and Ozark aquifers over an area covering about 7,500 square miles. The model will be used to simulate various projected water use increases out to 2057 (http://pubs.usgs.gov/sir/2009/5148/pdf/SIR2009-5148.pdf). A companion water level map report of the Springfield Plateaus and Ozark aquifers was published in 2007 by the USGS (http://pubs.usgs.gov/sir/2007/5253/pdf/SIR2007-5253.pdf).

The Sparta aquifer is a major water resource for municipal, industrial, and agricultural uses in Union County with water level declines of more than 360 feet in some areas. Local industry, the city of El Dorado, and Union County currently are working to reduce withdrawals from the Sparta aquifer through water reuse and withdrawing surface water for industry. The impact of these conservation efforts in the recovery of water levels within the Sparta aquifer is being monitored as well as any changes in water quality characteristics of the aquifer system. This study is providing continuous, real-time, web-accessible water-level data from a network of 8 wells and periodic water quality data (pH, conductance, and chloride) from a network of 12 wells. This project is in its ninth year and is funded by the Union County Water Conservation Board (UCWCB). The USGS is working closely with the consulting firm Burns and McDonnell who are under contract to the UCWCB. A fact sheet describing the project and results to date was published in 2007 (http://pubs.usgs.gov/fs/2007/3102/pdf/fs2007-3102.pdf).

The Ozark Plateaus study unit of the USGS National Water Quality Assessment Program was selected in 2004 as one of three new Nutrient Enrichment and Ecology Topic (NEET) study units. Approximately 30 stream sites in Arkansas, Missouri, and Oklahoma were sampled in 2006. The sites span the range of nutrient concentrations in streams in non-urban settings in the Springfield and Salem Plateaus. Sampling of water quality, benthic macroinvertebrates, and periphyton was conducted at two trend stream sites in 2005. Groundwater sampling of six wells was conducted in western Arkansas, western Missouri, and eastern Oklahoma in 2005 and 2009.

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

The Mississippi Embayment Regional aquifer Study (MERAS) was conducted with support from the Groundwater Resources Program of the USGS Office of Groundwater. A report documenting the construction and calibration of a finite difference groundwater model for use as a tool to quantify groundwater availability within the Mississippi embayment was published in 2009 (http://pubs.usgs.gov/sir/2009/5172/pdf/SIR2009-5172.pdf). Digital surfaces of selected Tertiary and younger age hydrogeologic units within the Mississippi Embayment aquifer system were created using more than 2,600 geophysical logs for an area that covers approximately 70,000 square miles and encompasses parts of eight states (http://pubs.usgs.gov/sir/2008/5098/pdf/SIR2008-5098.pdf). A companion report of the geophysical log database was also completed in 2008 (http://pubs.usgs.gov/sir/2008/5192/pdf/SIR2008-5192.pdf).

From 1940 through 2006, the USGS has conducted over 300 aquifer tests in Arkansas. Much of these data never have been published. A report published in 2008 presents the results from 206 of these aquifer tests from 21 different hydrogeologic units spread across 51 Arkansas counties (http://pubs.usgs.gov/sir/2008/5149/pdf/SIR2008-5149.pdf). Descriptive statistics are reported for each hydrologic unit with two or more tests, including the mean, minimum, median, maximum and standard deviation values for specific capacity, transmissivity, hydraulic conductivity, and storage coefficient.

Water quality data from approximately 2,500 sites were used to investigate the distribution of chloride concentrations in the Mississippi River Valley Alluvial aquifer in southeastern Arkansas. The distribution and range of chloride concentrations in the study area revealed distinct areas of elevated chloride concentrations. A report was published in 2008 (http://pubs.usgs.gov/sir/2008/5193/pdf/SIR2008-5193.pdf).

USGS worked with ADEQ Groundwater Section to do an assessment of the water quality of springs and one stream in the City of Eureka Springs. Analyses included comprehensive inorganic chemistry, select organics, and a suite of “emerging contaminants” derived from wastewater and other urban uses. The potential for contamination of the springs by organic constituents covered by the emerging contaminants analyte list was considered relatively high due to the aging and leaky sewage infrastructure in the City, particularly as indicated by previous tracer tests establishing direct linkage between the sewage system and at least one of the sampled springs. EC data would allow determination of sewage contamination and potentially tracing and identification of specific contaminant sources. This project has provided a limited dataset focusing on a select subset of springs, providing for preliminary but improved understanding of the spring hydrologic system and enabling more efficient and effective design of the later comprehensive study.

The Arkansas Department of Environmental Quality provide full inorganic and nutrient chemical analyses, and is including Eureka Springs in the agencies long-term Northwest Arkansas Groundwater study; ADEQ plans to sample 12 selected sites at Eureka Spring on a continuing, periodic basis. This ADEQ effort will be a valuable complement to the proposed study. The USGS also provided for indicator bacteria sampling and analysis. Results showed presence of bacteria in all samples, nutrients were below EPA MCL’s, EC’s were found in surface water samples but were rare in spring water samples.

The water use program in Arkansas is a cooperative effort between the Arkansas Natural Resources Commission and the USGS to inventory water use. During 2005, the amount of water withdrawn from ground and surface water sources in Arkansas was estimated to be 11,455 million gallons per day (mgd). Of this amount, about 7,510 mgd (66%) was from groundwater and about 3,946 mgd (34%) was from surface water sources. A report was published in 2007 (http://pubs.usgs.gov/sir/2007/5241/pdf/SIR2007-5241.pdf).

Arkansas Department of Environmental Quality

During the second half of FY 2005, the Department groundwater program personnel initiated an intensive sampling program with the intent of sampling approximately one well per square mile in the upper Bayou Bartholomew watershed to assess the aerial distribution of arsenic with respect to geology and other attributes. A total of 109 water samples were collected from irrigation wells in the upper portion of the Bayou Bartholomew watershed in Jefferson County. The investigation demonstrated that elevated arsenic (>10 µg/L) occurs almost solely in stream channel deposits (Qcm), with low arsenic concentrations in the over bank deposits (Qso). Groundwater from the Qso deposits contained significantly higher sulfate concentrations than groundwater in the Qcm deposits. A strong inverse relationship between arsenic and sulfate concentrations tends to support an earlier theory of sulfide formation as a solubility control on soluble arsenic in groundwater.

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

The Department subsequently assisted the University of Arkansas in a detailed investigation into sources of arsenic in the upper Bayou Bartholomew watershed in Jefferson County. The investigation involved the coring of three holes along a line perpendicular to Bayou Bartholomew and including both the Qcm and Qso exposures, bench-scale leaching of sediment samples from the cores according to a tiered extraction process, X-ray diffraction of sediments, arsenic speciation of groundwater samples from wells installed in the three borings, and other activities to evaluate present theories derived from existing water quality analyses in the area. Activities completed in 2006 included drilling, coring for sediment samples, installation of wells, and the start of sediment extraction. Field activities were completed during 2006 and the laboratory extraction experiment was completed in late 2007. Results of the study have been published in several parts, within one master’s thesis and one PhD dissertation produced under the auspices of the U of A Department of Geosciences.

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

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

In northwest Arkansas, both hydrologic budget analyses and contaminant transport have been studied to a greater degree in terms of surface-water/groundwater 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 Department, the University of Arkansas at Fayetteville, the USGS, the ANRC and the U. S. National Park Service (USNPS). 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 groundwater interaction.

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

Mill Creek is a major tributary to the Buffalo National River that has been shown to contribute 96 percent of the nitrate/nitrite-nitrogen load to the Buffalo River below their confluence. Macroinvertebrate community structure and function analyses demonstrate this nitrate load and other pollutants detrimentally affect biologic communities within Mill Creek and the Buffalo River. A synoptic survey of Mill Creek revealed nitrate and orthophosphate concentrations increase upstream to peak at two springs near its headwaters. 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 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.

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

There are numerous potential and actual sources of groundwater 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 groundwater quality, because each source varies in the aerial extent of resulting contamination and in the impact to water quality. For example, a hazardous waste site may result in a severe impact to groundwater with numerous organic contaminants exceeding drinking water standards. However, the aerial extent of the contaminant plume may be very limited with no known receptors at risk. Conversely, contamination from agricultural activities may be aerially extensive with little or no impacts to use of the water for drinking and/or other purposes.

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

Several investigations have documented nitrate problems in northwest Arkansas, and ongoing monitoring programs in the Coastal Plain area of the State have revealed numerous detections of low concentration pesticides in conjunction with row-crop agriculture. Saltwater intrusion is a localized but very serious problem related to heavy drawdown, irrigation practices, and/or the area hydrogeology. Brine contamination is also a localized problem related to improperly lined surface impoundments, corroded casing of injection wells, or from earlier improper disposal to the land surface or streams. Also, the Surface Water Treatment Rule (SWTR) package under the Safe Drinking Water Act 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 Department's ongoing, ambient water quality monitoring program is to document changes in the quality of groundwater 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. Occurrence of these contaminants is often unique to the stratigraphy of the aquifer, the depositional environments in which the strata were deposited, and in the case of radionuclides, the redox conditions in the water producing horizons.

It is important to differentiate sources of water quality data when evaluating groundwater 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, not actual groundwater quality. Table V-4 lists the major potential sources of contamination.

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

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

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

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

Table V-5 lists the present status of the State Groundwater 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 Department's Water Division has taken toward early detection at facilities with potential sources of groundwater contamination is to include groundwater 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 groundwater contamination. The State Permitting Branch has begun permitting commercial facilities which treat petroleum contaminated soils and is currently revising the permit requirements for land application of drilling fluid sites. Groundwater Protection Program personnel are active in reviewing these permits in order to insure that groundwater will be protected beneath these facilities. In addition to these steps, the Groundwater 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 groundwater 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 groundwater remediation criteria across all programs. Both the draft policy and technical guidance were completed and signed by the Director in 2006.

Table V-4: Major Sources of Groundwater Contamination

Contaminant Source	Ten Highest Priority Sources (X)	Factors Considered
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-5: Summary of State Groundwater Protection Programs

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

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

REFERENCES FOR PART V

Ackerman, D.J., 1996, Hydrology of the Mississippi River Valley Alluvial Aquifer, South-Central United States. U.S. Geological Survey Professional Paper 1416-D.

Arkansas Natural Resources Commission, 2008, Arkansas Groundwater Protection and Management Report for 2007. ANRC, Little Rock, Arkansas.

Davis, R.K., Thomas, G, Perkins, R, Unger, T, Brahana, J.V., and Ting, T., In Press, Basin Scale Modeling of Multiple Tracer Breakthrough in Fractured Limestone. MODFLOW and More 2006: Managing Groundwater Systems, International Groundwater Modeling Center, Golden, Colorado, May 21-24, 2006.

Kresse, T.M., Van Schaik, E.J., Wise, J.A. and Huetter, T.A., 1997, Occurrence of Pesticides in Alluvial Aquifer of Eastern Arkansas. Arkansas Department of Pollution Control and Ecology, WQ97-10-1, Little Rock, AR. 39 p.

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PART VI PUBLIC PARTICIPATION (REG NO. 8)

The Public Participation Program (Regulation No. 8) at the Department is designed to be an active program that seeks out individuals and/or organizations that may provide useful input and those who will be affected by Department activities. The program includes provisions for disseminating information to the public through easily accessible avenues. These avenues include, but are not limited to, local media, internet access, and information depositories located throughout the State. Additional avenues include the publication and distribution of newsletters, informational pamphlets, and activity reports; and the participation of Department representatives at public meeting, hearings, and citizen group gatherings.

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

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

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

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Appendix A WATERBODY-SPECIFIC INFORMATION BY PLANNING SEGMENT

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

Data included for each planning segment includes:

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

Key to abbreviations on Appendix A Tables:

General
E = Evaluated Assessment
M = Monitored Assessment
U = Unassessed (Unknown)
S = Use Supported
N = Use Not Supported
R = Use Removed

Designated Use
FC = Fish Consumption
FSH = Fisheries Use
PC = Primary Contact
SC = Secondary Contact
DW = Drinking Water Use
AI =Agriculture and Industrial Use

Cause
SI = Siltation/Turbidity
AM = Ammonia
NO_3 = Nitrogen (Nitrates)
TP = Total Phosphorus
NU = Nutrients (NO_3, TP)
DO = Dissolved Oxygen
Temp = Water Temperature
PA = Pathogen Indicators (Bacteria)
CL = Chlorides
SO_4 = Sulfates
TDS = Total Dissolved Solids
OE = Organic Enrichment
PO = Priority Organics
Al = Aluminum
Be = Beryllium
Cu = Copper
Hg = Mercury
Pb = Lead
Zn = Zinc

Source
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
NB = Naturally Occurring (Background)

Water Quality Monitoring
Y = USGS Gauging Station Present
A = Ambient Network Sampling Station
R = Roving Network Sampling Station
S = Special Project Sampling Station
USNPS = U.S. National Park Service
1 = Assessment based on new data
2 = Assessment forwarded from 2010

STATUS = assessment status

1 = Attaining all water quality standards;

2 = Attaining some water quality standards, but there are insufficient data to determine if other standards are being attained;

3 = Insufficient data to determine if any water quality standards are attained;

- No data available;
- The data do not meet the spatial and/or temporal requirements outlined in this assessment methodology;
- Waters in which the data are questionable because of QA/QC procedures and those requiring confirmation of impairment before a TMDL is scheduled.

4 = One or more water quality standards not attained but does not require the development of

a TMDL because:

a. A TMDL has been completed for the listed parameter(s);

b. Waters which are impaired by point source discharges and future permits restrictions are expected to correct the problem(s).

c. Waters that currently do not meet an applicable water quality standard, but the impairment is not caused by a pollutant.

5 = The waterbody may be impaired, or one or more water quality standards may not be attained. Water Bodies in Category 5 will be prioritized in the following manner:

High

- Truly impaired; develop a TMDL or other corrective action(s) for the listed parameter(s).

Medium

- Waters currently not attaining standards, but may be de-listed with future revisions to Regulation No. 2, the State water quality standards; or
- Waters which are impaired by point source discharges and future permit restrictions are expected to correct the problem(s).

Low

- Waters currently not attaining one or more water quality standards, but all designated uses are determined to be supported; or
- There are insufficient data to make a scientifically defensible decision concerning designated use attainment; or
- Waters the Department assessed as unimpaired, but were added to the list by EPA.

An issue of concern is the evaluation of the fisheries designated use as impaired based solely on water quality chemistry data instead of biological data. Past and recent studies conducted by the Department (Physical, Chemical and Biological Assessment of the Bayou Bartholomew Watershed, April 2001; Physical, Chemical and Biological Assessment of the Strawberry River Watershed, December 2003; Total Maximum Daily Load (TMDL) for pH, Mulberry River, Arkansas, 2009) have all indicated that stream segments that were listed as not supporting the fisheries designated use based on water chemistry data were in fact fully supporting the fisheries designated use. The current list of impaired water bodies has 140 stream segments listed as not supporting the fisheries designated use; yet only approximately 12 stream segments and less than 100 stream miles, have biological data to support the listing.

The State received a record amount of rainfall in 2009; over 82 inches, which was more than 32 inches above normal. Precipitation during the spring of 2010 was also well above average. Thus, many of the evaluations during the low-flow, critical season actually occurred during high flow events.

APPENDIX A. TABLE OF CONTENTS

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 and Lake Columbia is a major impoundment on Beech Creek, a tributary to Dorcheat Bayou.

Summary of Water Quality Conditions

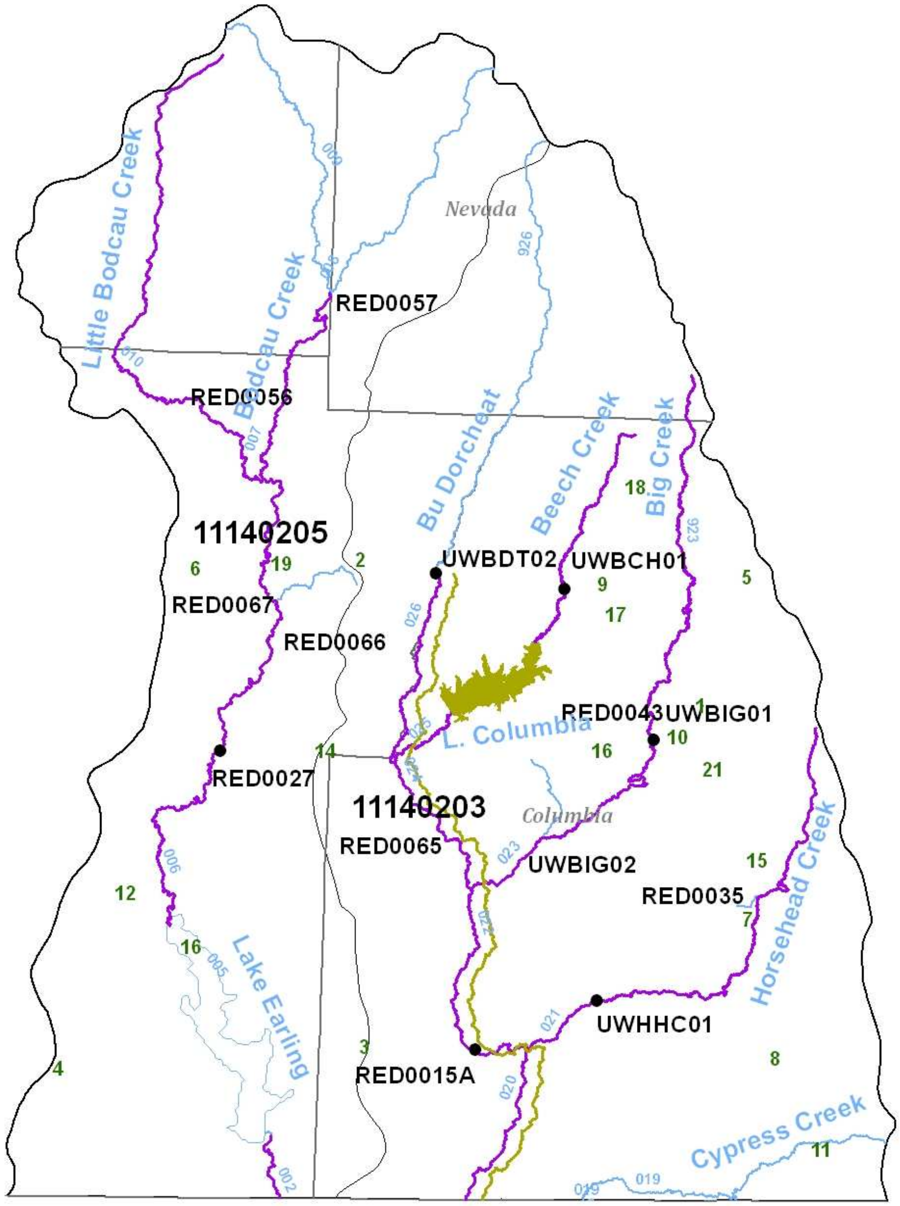
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies.

Many of the streams in this segment are affected by low pH values and are unable to meet the minimum pH standard of 6 standard units. The soils in these watersheds are acidic and have a low buffering capacity. Arkansas's pH standards, adopted in the 1970s, were established to protect the variable life stages of the most sensitive aquatic life species. These standards were based on data generated in a laboratory setting, unlike most of Arkansas's other water quality standards that were developed by utilizing the least-disturbed ecoregion reference stream approach. In addition, the current assessment protocol is from an EPA guidance document that sets a nationwide exceedance criterion. Thus, neither Arkansas's current pH standards, nor the assessment criteria, are based on "actual ambient conditions".

Many of the streams in this segment have mineral concentrations, chlorides, sulfates, and total dissolved solids, above the applicable standards. While the source of the minerals is listed as unknown, it most likely from a combination of point source discharges and nonpoint source inputs from oil and gas activities.

Lead concentrations in toxic amounts are present in the streams throughout the segment. It is unknown at this time what affects, if any, these concentrations are having on the aquatic life of the streams of the segment. The source is also unknown at this time.

Figure A-1: Planning Segment 1A



(Segment 1A)

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

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-1A																										
Dorcheat Bayou	11140203	-926	11.4	UWBDT01	M	S	S	S	S	S	S									1				FISH CONSUMPTION	121.4	39.0
Dorcheat Bayou	11140203	-026	11.7	UWBDT02	M	N	N	S	S	S	S	UN	UN	UN		pH	Pb	Hg		5	5	4a		FISHERIES	18.4	142.0
Dorcheat Bayou	11140203	-024	7.0	RED0065	M	N	S	S	S	S	S	UN	UN			pH	Hg			5	4a			PRIMARY CONTACT	160.4	0.0
Dorcheat Bayou	11140203	-022	8.4	RED0015A	M	N	N	S	S	S	N	UN	UN	UN	UN	pH	SO4	Pb	Hg	5	5	5	4a	SECONDARY CONTACT	160.4	0.0
Dorcheat Bayou	11140203	-020	11.9		E	N	N	S	S	S	N	UN	UN	UN	UN	pH	SO4	Pb	Hg	5	5	5	4a	DRINKING SUPPLY	160.4	0.0
Cypress Creek	11140203	-019	18.5		U															3				AGRI & INDUSTRY	136.8	23.6
Horsehead Creek	11140203	-021	16.8	UWHHC01	M	S	N	S	S	S	S	UN	UN			pH	Pb			5	5					
Big Creek	11140203	-923	18.5	UWBIG01	M	S	N	S	S	S	S	IP	IP			pH	Pb			5	5					
Big Creek	11140203	-023	3.3	UWBIG02	M	S	N	S	S	S	N	IP	IP			Cl	SO4	TDS	Pb	5	5	5	5			
Beech Creek	11140203	-025	15.7	UWBCH01	M	S	N	S	S	S	S	UN	UN	UN		DO	Tb	Pb		5	5	5				
L. Bodcau Creek	11140205	-010	19.5	RED0056	M	S	N	S	S	S	S	UN	UN			DO	Pb			5	5					
Bodcau Creek	11140205	-009	9.5		U															3						
Bodcau Creek	11140205	-008	9.1		U															3						
Bodcau Creek	11140205	-007	7.8	RED0057	M	S	N	S	S	S	S	UN				Pb				5						
Bodcau Creek	11140205	-006	22.4	RED0027	M	S	N	S	S	S	S	UN	SE	UN		pH	Tb	Pb		5	5	5				
Bodcau Creek	11140205	-002	6.0		E	S	N	S	S	S	S	UN	SE	UN		pH	Tb	Pb		5	5	5				
TOTAL MILES	197.5																									
MILES UNASSESSED	33.7																									
MILES EVALUATED	17.9																									
MILES MONITORED	142.5																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWBDT01	Bayou Dorcheat at Highway 355		2	R
UWBDT02	Bayou Dorcheat at Highway 82, 6 miles west of Waldo		2	R
RED0015A	Bayou Dorcheat east of Taylor	Y	1	A
UWHHC01	Horsehead Creek at Highway 19, 2 miles north of Walkerville		2	R
UWBIG01	Big Creek at Highway 132 near Magnolia		2	R
UWBIG02	Big Creek at Co. Rd. ~1.3 mi. SE of Highway 371		2	R
RED0065	Bayou Dorcheat at Highway 371		2	R
UWBCH01	Beech Creek at Highway 82 near Waldo		2	R
RED0056	Little Bodcaw Creek at Highway 29 near Lewisville		2	R
RED0057	Bodcaw Creek at Highway 355 near Hempstead County Line		2	R
RED0027	Bodcaw Creek south of Lewisville	Y	1	A

Table A-2: Segment 1A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0000434	AMFUEL-MAGNOLIA	TRIB,BIG CR,DORCHEAT BU,RED RV	023	11140203	Columbia	1
AR0000493	ENTERGY AR-HARVEY COUCH STEAM ELECTRIC STA.	TRIB, LK JUNE,CROOKED BRNCH,BODCAU CR	006	11140205	Lafayette	2
AR0020044	TAYLOR, CITY OF	LTL CROOKED CR, RED RV BASIN	020	11140203	Columbia	3
AR0020621	BRADLEY, CITY OF	TRIB,WHEELER CR,MARTIN CR,BODCAU BU	002	11140205	Lafayette	4
AR0021555	MCNEIL, CITY OF	O'REAR CR,BIG CR,RED RV	023	11140203	Columbia	5
AR0035696	LEWISVILLE (C/O HON JIMMY ALEXANDER)	BATTLE CR,STEEL CR, BODCAU CR, LK ERLING	006	11140205	Lafayette	6
AR0038857	ALBEMARLE CORP-SOUTH PLANT	TRIB,HORSEHEAD CR,DORCHEAT BU,RED RV	021	11140203	Columbia	7
AR0039594	EMERSON, CITY OF	TRIB,LTL CYPRESS CR,DORCHEAT BU	019	11140203	Columbia	8
AR0043508	WALDO, CITY OF	TRIB,BIG CR,DORCHEAT BAYOU	023	11140203	Columbia	9
AR0043613	MAGNOLIA, CITY OF-BIG CREEK WWTP	BIG CR,DORCHEAT BU,RED RV	023	11140203	Columbia	10
AR0043923	WEYERHAEUSER NR COMPANY - EMERSON DIVISION	DIT,N CYPRESS CR,DORCHEAT BU,L BISTINEAU,LOGGY BU	019	11140203	Columbia	11
AR0045535	CANFIELD BAPTIST ASSEMBLY	TRIB,MILL BR,HEIRS BR,LK ERLING	006	11140205	Lafayette	12
AR0046345	SPRING HILL SCHOOL	TRIB,FLAT BOIS D'ARC CR,LT BODCAU	010	11140205	Hempstead	13
AR0046418	BONANZA CR ENERGY RESOURCES, LLC - MCKAMIE PLNT	TRIB,CROOKED CR,DORCHEAT BU,RED RV	020	11140203	Lafayette	14
AR0046973	MAGNOLIA COUNTRY CLUB	TRIB, HORSEHEAD CR, DORCHEAT BU	021	11140203	Columbia	15
AR0047635	ALBEMARLE CORPORATION-WEST PLANT	TRIB,DISMUKES CR,BIG CR,BU DORCHEAT	023	11140203	Columbia	16
AR0047953	DELTIC TIMBER CORP.-WALDO MILL	TRIB,BEECH CR,LK COLUMBIA	025	11140203	Columbia	17
AR0048054	QUAD HARDWOOD PRODUCTS	TRIB,BEECH CR,DORCHEAT BU,RED RV	025	11140203	Columbia	18
AR0048305	STAMPS, CITY OF-SOUTH WWTF	DIT,BODCAU CR,LK ERLING,RED RV BAS.	006	11140205	Lafayette	19
AR0051349	TUCKER LUMBER CO., LLC	UNNAMED TRIB, LTL CROOKED CR,DORCHEAT BU, RED RV		11140203	Union	20
AR0051489	W2 OIL, INC.	TRIB NATIONS CR, NATIONS CR, BIG CR, BU DORCHEAT	923	11140203	Columbia	21

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

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 on the Red River near its entrance into Arkansas indicate that the total dissolved solids, sulfate, and chloride criteria, protective of the public water supply use, are 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. The source of the minerals is thought to be from naturally occurring mineral deposits located in western Oklahoma.

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

Data trends for Days Creek reveal major water quality improvements in the creek as a result of the City of Texarkana's improvement of its WWTP. However, Day's Creek continues to not meet the drinking water designated use due to high nitrate levels. A TMDL to address this issue was completed in early 2006.

Turbidity trend analysis from the Sulphur River indicates an increasing trend over the past fourteen years from an average of about 20 NTU to over 50 NTU (Figure A-3). Turbidity concentrations the past seven years have routinely been above the instream "All Flows" standard of 32 NTU, but there seems to be somewhat of a decreasing trend in turbidity during that time period. Three stream reaches of the Sulphur River in Arkansas have been assessed as not attaining the fisheries designated use due to excessive instream turbidity; predominately caused by surface erosion.

Figure ***A-2: Planning Segment 1B***

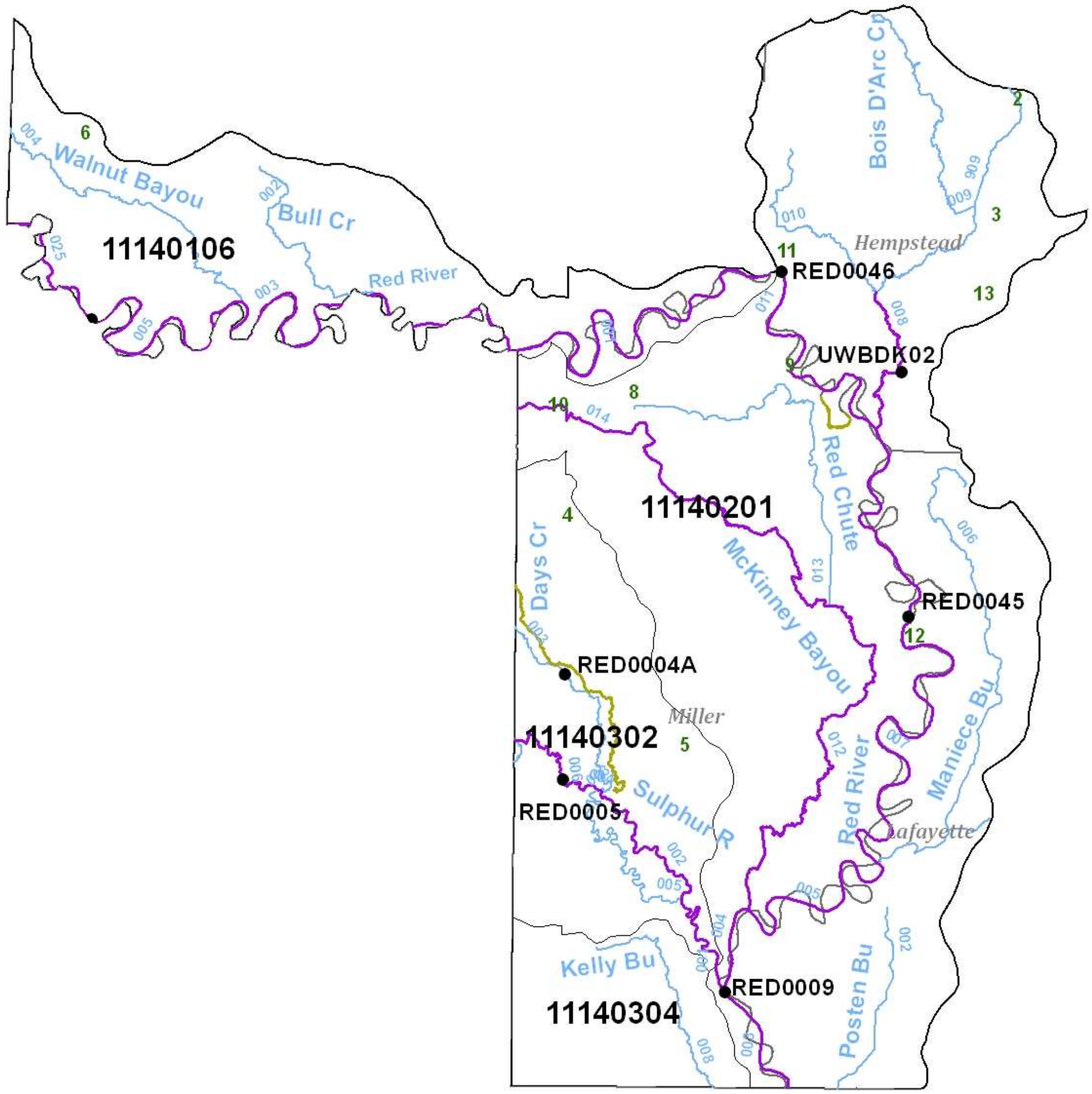


Table A-3: Planning Segment 1B—Designated Use Attainment Status and Water Quality Monitoring Stations

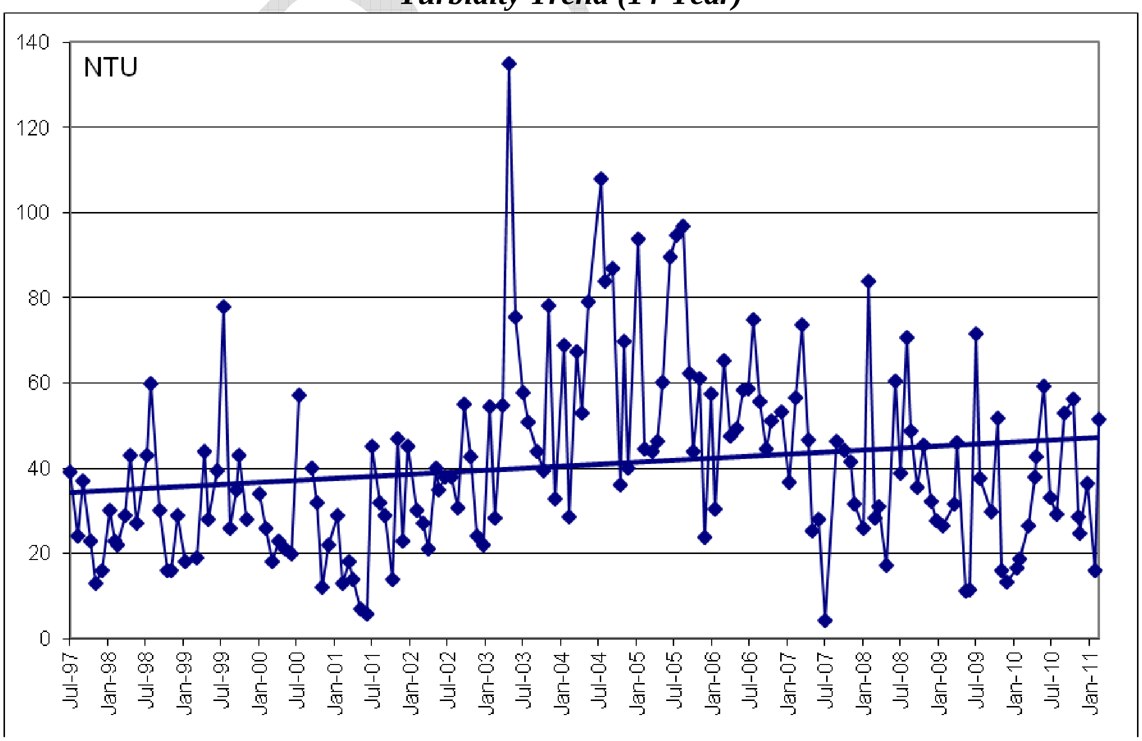
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-1B																										
Red River	11140201	-011	15.2	RED0046	M	S	S	S	S	S	N	UN	UN			Tb	TDS			5	5			FISH CONSUMPTION	321.4	0.0
Red River	11140201	-007	40.1	RED0045	M	S	S	S	S	S	N	UN	UN			Tb	TDS			5	5			FISHERIES	298.6	22.8
Red River	11140201	-005	12.0		E	S	S	S	S	S	N	UN	UN			Tb	TDS			5	5			SWIMMING	321.4	0.0
Red River	11140201	-004	4.0		E	S	S	S	S	S	N	UN	UN			Tb	TDS			5	5			SECONDARY CONTACT	321.4	0.0
Red River	11140201	-003	15.5	RED0009	M	S	S	S	S	S	N	UN	UN			Tb	TDS			5	5			DRINKING SUPPLY	287.6	33.8
Posten Bayou	11140201	-002	18.7		E															3				AGRI & INDUSTRY	112.0	209.4
Maniece Bayou	11140201	-006	24.2		U															3						
Bois D'Arc Cr.	11140201	-008	8.9	UWBDK02	M	S	S	S	S	S	S	UN				DO				5						
Bois D'Arc Cr.	11140201	-009	20.4	UWBDK01	M	S	S	S	S	S	S									1						
Bridge Creek	11140201	-010	12.1		E	S	S	S	S	S	S									1						
McKinney Bayou	11140201	-012	23.1	RED0054	M	S	S	S	S	S	N	UN	UN	UN		Cl	SO4	TDS		5	5	5				
McKinney Bayou	11140201	-014	21.6	RED0055	M	S	S	S	S	S	N	UN	UN			SO4	TDS			5	5					
Red Chute Creek	11140201	-013	12.5		U															3						
Sulphur River	11140302	-001	6.3		E	S	N	S	S	N	S	UN	SE	UN	UN	Tm	Tb	SO4	TDS	5	5	5	5			
Sulphur River	11140302	-002	8.5		E	S	N	S	S	N	S	UN	SE	UN	UN	Tm	Tb	SO4	TDS	5	5	5	5			
Sulphur River	11140302	-004	0.7		E	S	N	S	S	N	S	UN	SE	UN	UN	Tm	Tb	SO4	TDS	5	5	5	5			
Sulphur River	11140302	-006	6.5	RED0005	M	S	N	S	S	N	S	UN	SE	UN	UN	Tm	Tb	SO4	TDS	5	5	5	5			
Sulphur River	11140302	-008	0.8		E	S	N	S	S	N	S	UN	SE	UN	UN	Tm	Tb	SO4	TDS	5	5	5	5			
Days Creek	11140302	-003	11.0	RED0004A	M	S	S	S	S	N	S	MP				NO3				4a						
Mercer Bayou	11140302	-005	12.8		U															3						
Red River	11140106	-001	34.8		E	S	S	S	S	S	N	UN	UN	UN	UN	Cl	SO4	TDS	Tb	5	5	5	5			
Red River	11140106	-003	9.8		E	S	S	S	S	S	N	UN	UN	UN	UN	Cl	SO4	TDS	Tb	5	5	5	5			
Red River	11140106	-005	25.3	RED0025	M	S	S	S	S	S	N	UN	UN	UN	UN	Cl	SO4	TDS	Tb	5	5	5	5			
Red River	11140106	-025	8.0		E	S	S	S	S	S	N	UN	UN	UN	UN	Cl	SO4	TDS	Tb	5	5	5	5			
Bull Creek	11140106	-002	9.3		E	S	S	S	S	S	S															
Walnut Bayou	11140106	-004	20.3	RED0064	M	S	S	S	S	S	S															
Kelley Bayou	11140304	-006	7.2		E	S	S	S	S	S	S															
TOTAL MILES	389.6																									
MILES UNASSESSED	49.5																									
MILES EVALUATED	132.2																									
MILES MONITORED	207.9																									

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

Table A-4: Segment 1B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0002968	DOMTAR A.W. LLC	PIPING & OPEN CANAL,RED RV	001	11140106	Little River	1
AR0021326	TYSON FOODS, INC. - HOPE PROCESSING PLNT	UNNAMED TRIB,CANEY CR,BOIS D'ARC CR,RED RV	909	11140201	Hempstead	2
AR0038466	HOPE, CITY OF-BOIS D'ARC WWTP	BLACK BR,BOIS D'ARC CR,RED RV	009	11140201	Hempstead	3
AR0038822	COOPER TIRE AND RUBBER COMPANY	TRIB,NIX CR,DAYS CR,SULPHUR R,RED RV	003	11140302	Miller	4
AR0041548	FOUKE, CITY OF	TRIB,CHICREN CR,BOGGY CR,SULPHUR RV	003	11140302	Miller	5
AR0042846	ASH GROVE CEMENT COMPANY	FRENCH CR,WALNUT BU,RED RV	004	11140106	Little River	6
AR0042951	ASHDOWN, CITY OF	DOMTAR CANAL,RED RV	001	11140106	Little River	7
AR0044709	PILOT TRAVEL CENTERS, LLC d/b/a FLYING J No. 606	TRIB,BOIS D'ARC BU,RED RV	014	11140201	Miller	8
AR0048356	TYSON FOODS INC-RIVER VALLEY ANIMAL FOODS	RED RIVER	011	11140201	Miller	9
AR0048691	TEXARKANA, CITY OF-NORTH WWTP	MCRINNEY BU,RED RV	014	11140302	Miller	10
AR0048810	FULTON, CITY OF	RED RIVER	011	11140201	Hempstead	11
AR0050857	GARLAND, CITY OF	RED RIVER	007	11140201	Miller	12
AR0051047	GREENWAY WASTEWATER TREATMENT PLNT	TRIB,BIG SLOUGH DITCH,ST FRANCIS RV	015	8020203	Clay	13

Figure A-3: Sulphur River (RED0005) Turbidity Trend (14-Year)



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 contain Ecologically Sensitive Waterbodies. Overall water quality is good in the basin with the exception of a few long-term problem areas.

Bear Creek has shown major improvements over the last several years, but is still impacted by elevated nutrients, mainly nitrogen, from the City of DeQueen effluent.

The Rolling Fork River above DeQueen Reservoir has elevated nutrient concentrations and has been placed on the 303(d) list for elevated copper concentrations. A TMDL addressing the nutrients was completed in 2006. Additional point source controls will be investigated to implement the TMDL and address the copper issue.

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

Figure A-4: Planning Segment 1C

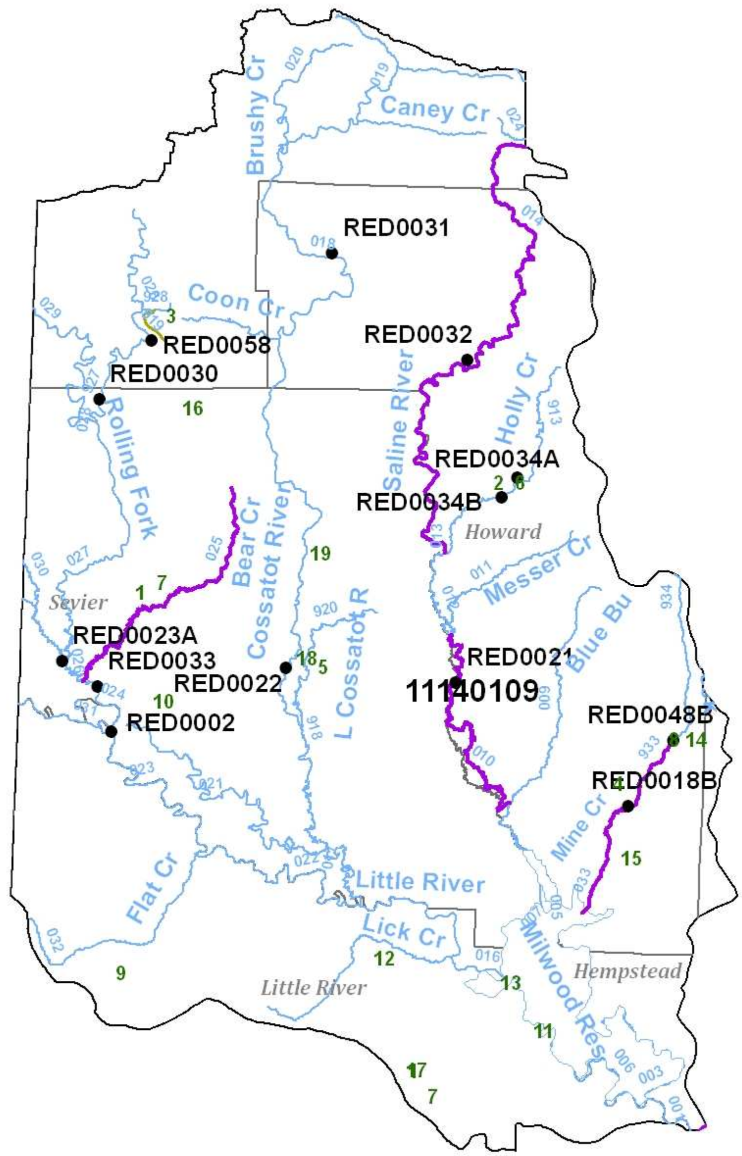


Table A-5: Planning Segment 1C—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-1C																										
Little River	1E+07	-001	4.0		U																			FISH CONSUMPTION	363.8	0
Mine Creek	1E+07	-934	9.1	RED0048A	M	S	S	S	S	S	S															
Mine Creek	1E+07	-933	1.3	RED0048B	M	S	N	S	S	S	S	IP				SO4				5						
Mine Creek	1E+07	-033	11.4	RED0018B	M	S	N	S	S	S	S	IP				SO4				5						
Blue Bayou	1E+07	-009	16.0	BLB0001	M	S	S	S	S	S	S									1						
Saline River	1E+07	-010	15.2	RED0021	M	S	N	S	S	S	S	Tb	Cu			SE	UN			5				FISHERIES	311	52.8
Messer Creek	1E+07	-011	12.6		E	S	S	S	S	S	S									1						
Saline River	1E+07	-012	6.1		E	S	S	S	S	S	S									1				PRIMARY CONTACT	363.8	0
Holly Creek	1E+07	-913	6.7	RED0034A	M	S	S	S	S	S	S									1				SECONDARY CONTACT	363.8	0
Holly Creek	1E+07	-013	6.2	RED0034B	M	S	S	S	S	S	S									1				DRINKING SUPPLY	363.8	0
Saline River	1E+07	-917	8.0		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	363.8	0
Saline River	1E+07	-014	12.1	RED0032	M	S	N	S	S	S	S	UN				DO				5						
Bridge Creek	1E+07			BRIOOO1	M	S	S	S	S	S	S									1						
Little River	1E+07	-016	11.7		E	S	S	S	S	S	S									1						
Cossatot R.	1E+07	-017	4.6		E	S	S	S	S	S	S									1						
Pond Creek	1E+07	-021	23.5	RED0063	M	S	S	S	S	S	S									1						
Cossatot R.	1E+07	-918	37.2	RED0022	M	S	S	S	S	S	S									1						
Cossatot R.	1E+07	-018	19.0	RED0031	M	S	S	S	S	S	S									1						
L. Cossatot R.	1E+07	-920	12.2	LCO01	M	S	S	S	S	S	S									1						
Cossatot R.	1E+07	-019	14.2		E	S	S	S	S	S	S									1						
Bushy Creek	1E+07	-020	11.6		E	S	S	S	S	S	S									1						
Little River	1E+07	-022	15.8		E	S	S	S	S	S	S									1						
Flat Creek	1E+07	-032	10.7		U															3						
Little River	1E+07	-023	17.8	RED0002	M	S	S	S	S	S	S									1						
Rolling Fork	1E+07	-024	1.7		E	S	S	S	S	S	S									1						
Bear Creek	1E+07	-025	17.3	RED0033	M	S	S	S	S	S	S									1						
Rolling Fork	1E+07	-919	12.8	RED0058	M	S	N	S	S	S	S	IP	IP			TP	NO3			4a	4a					
Rolling Fork	1E+07	-026	2.7	RED0023A	M	S	S	S	S	S	S									1						
Rock Creek	1E+07	-030	10.0		U															3						
Rolling Fork	1E+07	-927		RED0030	M	S	N	S	S	S	S	IP	IP			TP	NO3			4a	4a					
Rolling Fork	1E+07	-027	15.1		E	S	S	S	S	S	S									1						
Robinson Creek	1E+07	-029	25.6		E	S	S	S	S	S	S									1						
Rolling Fork	1E+07	-028	8.3		E	S	S	S	S	S	S									1						
Little River	1E+07	-031	8.0		E	S	S	S	S	S	S									1						
TOTAL MILES	388.5																									
MILES UNASSESSED	24.7																									
MILES EVALUATED	143.3																									
MILES MONITORED	220.5																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
RED0021	Saline River at Highway 24	Y	1	A
RED0034A	Holly Creek above Dierks		1	A
RED0034B	Holly Creek below Dierks		1	A
RED0032	Saline River at Highway 4 north of Dierks		1	A
SAL01	Saline River near Direks		2	S
SAL03	Saline River west Mineral Springs		2	S
PLM0001	Plum Creek at Highway 355		1	R
BLB01	Blue Bayou west of Mineral Springs		1	S
BRI01	Bridge Creek southwest of Lockesburg		1	S
CEG01	Cool Creek south of Walnut Springs		2	S
COS01	Cossatot River northwest of DeQueen		2	S
LCO01	Little Cossatot River Highway 24 near Lockesburg		2	R
COS03	Cossatat River south of Lockesburg		2	S
RED0031	Cossatot River at Highway 4 near Wickes		1	A
RED0022	Cossatot River at Highway 24 bridge	Y	1	A
RED0063	Pond Creek in the National Wildlife Refuge		1	R
RED0064	Walnut Bayou at Co. Rd. off Highway 32		1	R
RED0002	Little River near Horatio	Y	1	A
RED0033	Bear Creek below Process City		1	A
RED0033B	Bear Creek at Highway 24 near Horatio		2	A
RED0023A	Rolling Fork River at county road north of Highway 24	Y	1	A
RED0030	Rolling Fork River above Dequeen Reservoir		1	A
RED0058	Rolling Fork River near Grannis		1	A
RED0018B	Mine Creek at Highway 355 above Tyson effluent		1	A
RED0048A	Mine Creek at Highway 27 bypass above Tyson effluent		1	A
RED0048B	Mine Creek near Nashville below Tyson effluent		1	A
RED0051	City of Nashville effluent		2	S
DIL0001	Dillard creek at Highway 27 south of Nashville		2	S
MIN0002	Mine Creek 1.4 miles west of Tollette		2	S

Table A-6: Segment 1C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0002909	WEYERHAEUSER CO-DEQUEEN WOOD T	BEAR CR,ROLLING FK CR,LTL RV, RED RV	025	11140109	Sevier	1
AR0002917	WEYERHAEUSER DIERKS	HOLLY CR,SALINE RV,RED RV	013	11140109	Howard	2
AR0003018	TYSON FOODS, INC. - GRANNIS PROC. FACILITY	TRIB,ROLLING FORK R,LITTLE R,RED RV	919	11140109	Polk	3
AR0021261	MINERAL SPRINGS, CITY OF	MINE CR,MILLWOOD LK, LITTLE RV, RED RV	033	11140109	Howard	4
AR0021377	LOCKESBURG, CITY OF	LTL COSSATOT R TRIB	918	11140109	Sevier	5
AR0021709	DIERKS, CITY OF	HOLLY CR,SALINE RV,LITTLE RV,RED RV	013	11140109	Howard	6
AR0021733	DEQUEEN, CITY OF	TRIB,BEAR CR,ROLLING FORK RV,LITTLE	025	11140109	Sevier	7
AR0021776	NASHVILLE, CITY OF	MINE CR,MILLWOOD LK,LITTLE RV,RED RV	033	11140109	Howard	8
AR0023817	FOREMAN, CITY OF	E FLAT CR,FLAT CR,LITTLE RV,RED RV	032	11140109	Little River	9
AR0035785	HORATIO, CITY OF	TRIB,POND CR,COSSATOT RV,LITTLE RV,MILLWOOD LK	032	11140109	Sevier	10
AR0037079	ARK PARKS MILLWOOD DAM PARK	TRIB,BUSTER CR,LITTLE RV,RED RV	006	11140109	Little River	11
AR0040886	WILTON, TOWN OF	TRIB,LICK CR,MILLWOOD LAKE,LITTLE RIVER, RED RIVER	016	11140109	Little River	12
AR0041246	MILLWOOD WATER CORP	TRIB (LK MILLWOOD),LITTLE RV,RED RV	006	11140109	Little River	13
AR0041734	TYSON FOODS, INC.-NASHVILLE	MINE CR,MILLWOOD LK,LITTLE RV,RED RV	933	11140109	Howard	14
AR0045144	TOLLETTE, CITY OF	MINE CR,MILLWOOD LK,LITTLE RV,RED RV	033	11140109	Howard	15
AR0047996	GILLHAM REGIONAL WW DISTRICT	BELLAH CR,DEQUEEN LK,ROLLING FK CR	027	11140109	Sevier	16
AR0048411	DOMTAR A.W.CORP.	TRIB,HUDSON CR,LITTLE RV	016	11140109	Little River	17
AR0048593	TRINITY MATERIALS INC.	BRNCH/MILL SLU,MILL SLU,COSSATOT R, LITTLE RV	918	11140109	Sevier	18
AR0049034	COSSATOT ROCK, LLC	TRIB,HALE CR,COSSATOT RV,LTL RV, MILLWOOD LK, RED RV	918	11140109	Sevier	19

SEGMENT 1D MOUNTAIN FORK AND TRIBUTARIES

This segment is located on the western edge of Montgomery County and covers a portion of Polk County. It encompasses a 22-mile reach of the Mountain Fork of Little River from its headwaters to the Arkansas-Oklahoma state line.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation and public, industrial, and agricultural water supplies. The Mountain Fork River is also designated as an Extraordinary Resource Waterbody and an Ecologically Sensitive Waterbody because of the occurrence of the leopard darter (*Etheostoma pantherina*).

The waters within this segment currently maintain all assigned designated uses, but a portion of the Mountain Fork does not meet the all flows turbidity water quality standard.

The State received a record amount of rainfall in 2009, over 82 inches, which was more than 32 inches above normal. Precipitation during Spring of 2010 was also well above average. Thus, much of the data collected during what would be considered the low-flow season actually occurred during high flow events.

Figure A-5: Planning Segment 1D

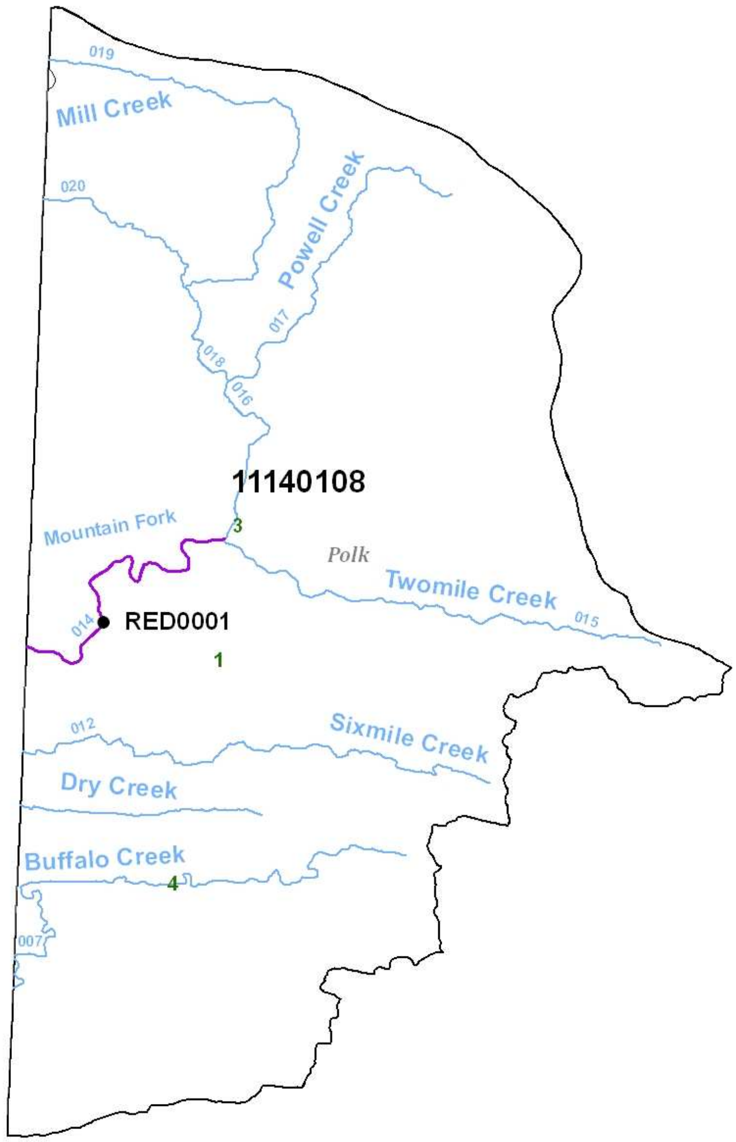


Table A-7: Planning Segment 1D—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-1D																										
Buffalo Creek	1.1E+07	-007	9.5		U															3				FISH CONSUMPTION	47.3	0
Sixmile Creek	1.1E+07	-012	4.1		U															3				FISHERIES	47.3	0
Mountain Fork	1.1E+07	-014	11.0	RED0001	M	S	S	S	S	S	S	Tb				SE				5				PRIMARY CONTACT	47.3	0
Twomile Creek	1.1E+07	-015	8.1		E	S	S	S	S	S	S									1				SECONDARY CONTACT	47.3	0
Mountain Fork	1.1E+07	-016	4.5		E	S	S	S	S	S	S									1				DRINKING SUPPLY	47.3	0
Mountain Fork	1.1E+07	-018	2.8		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	47.3	0
Powell Creek	1.1E+07	-017	4.7		E	S	S	S	S	S	S									1						
Mill Creek	1.1E+07	-019	12.2		E	S	S	S	S	S	S									1						
Mountain Fork	1.1E+07	-020	4.0		E	S	S	S	S	S	S									1						
TOTAL MILES	60.9																									
MILES UNASSESSED	13.6																									
MILES EVALUATED	36.3																									
MILES MONITORED	11																									

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

Table A-8: Segment 1D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0035483	HATFIELD, CITY OF	JOSHLING CR,MOUNTAIN FORK RV	014	11140108	Polk	1
AR0037605	ARK PARKS QUEEN WILHELMINA	TRIB,MILL CR,MTN FK/LITTLE RV,...	019	11140108	Polk	2
AR0046787	BOY SCOUTS OF AMERICA - CAMP PIONEER	TWO MILE CR,MOUNTAIN FORK RIVER,LITTLE RIVER	015	11140108	Polk	3
AR0049247	COVE, CITY OF	BUFFALO CR,MOUNTAIN FORK RV,RED RV	007	11140108	Polk	4

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. Row crop agriculture is also the dominant land use in this watershed.

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.

Portions of the Boeuf River and Oak Bayou have been evaluated as not meeting their respective turbidity and mineral standards. The watershed is dominated by row-crop agriculture. Total Maximum Daily Loads have been completed for each of these waterbodies and are being implemented through the Nonpoint Source Program at the Arkansas Natural Resources Commission.

Figure A-7: Planning Segment 2A

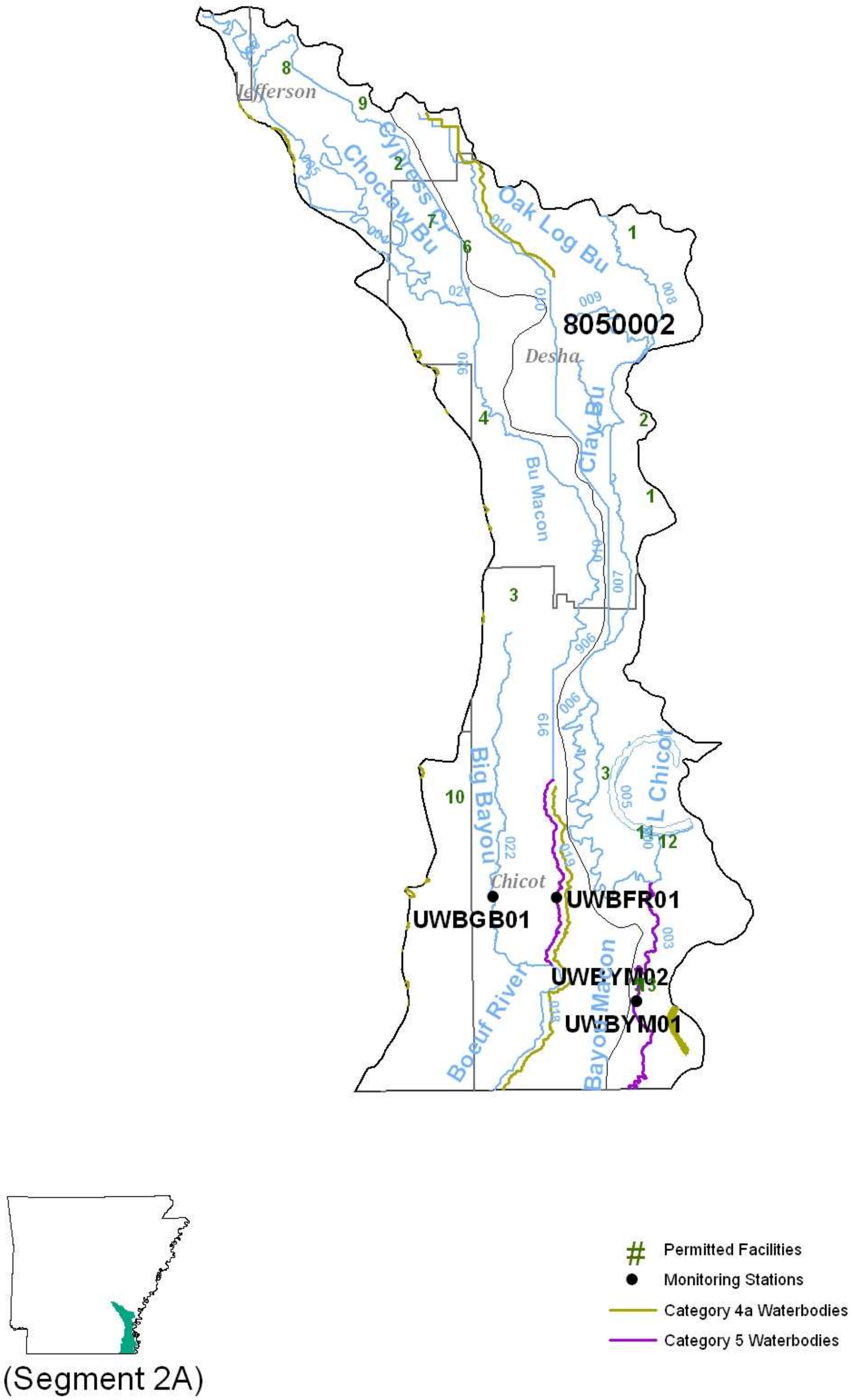


Table A-9: Planning Segment 2A—Designated Use Attainment Status and Water Quality Monitoring Stations

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-2A																										
Boeuf River	8050001	-018	49.4	OUA0015A	M	S	N	S	S	S	S	AG	AG	AG		Tb	SO4	CL		4a	4a	4a		FISH CONSUMPTION	464.2	0
Boeuf River	8050001	-019	58.1	UWBFR01	M	S	N	S	S	S	S	AG	AG	AG		Tb	SO4	CL		4a	4a	4a		FISHERIES	338.4	125.8
Big Bayou	8050001	-022	27.1	UWBGB01,+	M	S	S	S	S	S	S									1				PRIMARY CONTACT	464.2	0
Cypress Creek	8050001	-020	47.5	OUA0180	M	S	S	S	S	S	S									1				SECONDARY CONTACT	464.2	0
Choctaw Bayou	8050001	-021	58.9	OUA0181	M	S	S	S	S	S	S									1				DRINKING SUPPLY	445.9	18.3
Macon Bayou	8050002	-003	80.5	UWBYM01	M	S	S	S	S	S	S	UN				CL				5				AGRI & INDUSTRY	445.9	18.3
Ditch Bayou	8050002	-004	4.0	OUA0172	M	S	S	S	S	S	S									1						
Macon Bayou	8050002	-006	38.6		E	S	S	S	S	S	S									1						
Clay Ditch	8050002	-007	24.3	OUA0173	M	S	S	S	S	S	S									1						
Boggy Creek	8050002	-009	12.0		E	S	S	S	S	S	S									1						
Oak Bayou	8050002	-910	18.3	OUA0179+	M	S	N	S	S	N	N	AG	AG	AG		Tb	CL	TDS		4a	4a	4a				
Canal No. 43	8050002	-010	28.5	OUA0174	M	S	S	S	S	S	S									1						
Red Fork Creek	8050002	-008	17.0	OUA0177	M	S	S	S	S	S	S									1						
TOTAL MILES	464.2																									
MILES UNASSESSED	0																									
MILES EVALUATED	50.6																									
MILES MONITORED	413.6																									

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

Table A-10: Segment 2A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0021610	WATSON, CITY OF	RED FK BU,BOGGY BU,CLAY BU,BU MACON, STATE OF LA	008	8050002	Desha	1
AR0021679	GOULD, CITY OF	TRIB,KERCH CANAL,CYPRESS CR,BOEUF RV,OUACHITA RV	020	8050001	Lincoln	2
AR0021849	LAKE VILLAGE, CITY OF	LTL LAKE BU,BU MACON,BOEUF RV,OUACHITA RV	006	8050002	Chicot	3
AR0033707	TILLAR, CITY OF	CAN # 18,MACON BU,BOEUFF RV	920	8050001	Desha	4
AR0033839	EUDORA, CITY OF	BU MACON,OUACHITA RV	003	8050002	Chicot	5
AR0033987	DUMAS, CITY OF	CAN # 19,BU MACON,OUACHITA RV	020	8050001	Desha	6
AR0037125	MITCHELLVILLE, CITY OF	TRIB, DITCH 19,AMOS BU,MACON BU, BOEUF RIVER	020	8050001	Desha	7
AR0039381	GRADY, CITY OF	CAN # 19,BU MACON,BOEUF RV,OUACHITA	020	8050001	Lincoln	8
AR0040827	AR DEPT OF CORRECTION-CUMMINS/	CAN # 19	020	8050002	Lincoln	9
AR0041297	MONTROSE, CITY OF-WASTE WATER	TRIB WARDS BU,BIG BU,BOEUF RV	022	8050001	Ashley	10
AR0050008	CHICOT COUNTY PARK	LK CHICOT,DITCH BU,MACON BAYOU,...	004	8050002	Chicot	11
AR0050091	CHICOT COUNTY-DITCH BAYOU BOAT	DITCH BU,BU MACON	004	8050002	Chicot	12
AR0050580	ALABAMA CATFISH, INC. D/B/A HARVEST SELECT CATFISH EUDORA	BU MACON,OUACHITA RV	003	8050001	Chicot	13

SEGMENT 2B BAYOU BARTHOLOMEW AND TRIBUTARIES

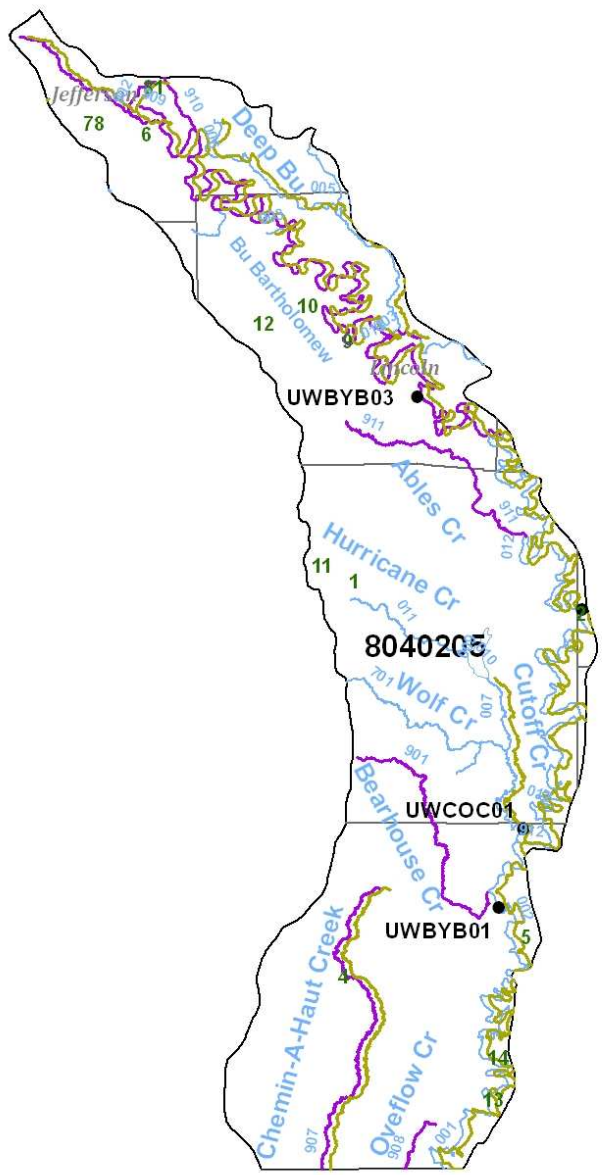
Segment 2B, located in the southeastern part of Arkansas and drains portions of Jefferson, Lincoln, Drew, and Ashley Counties and very small portions of Cleveland, Desha, and Chicot Counties. The major streams in this segment are Bayou Bartholomew, Ables Creek, Cutoff Creek, Deep Bayou, and their tributaries.

Summary of Water Quality Conditions

The waters within this segment have been designated as suitable for the propagation of fish, wildlife, primary and secondary contact recreation, as well as public, industrial, and agricultural water supplies. This segment contains a total of 489.3 stream miles, all of which are being assessed.

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 within many of these streams. For almost 20 years, the Bayou Bartholomew Alliance has been addressing these concerns through the implementation of best management practices on a watershed scale. The seven year trend analysis indicates a noticeable decline in the instream turbidity in Bayou Bartholomew. This may be indicating progress towards reducing nonpoint source pollution in the watershed.

Figure A-8: Planning Segment 2B



(Segment 2B)

Permitted Facilities
● Monitoring Stations
Category 4a Waterbodies
Category 5 Waterbodies

Table A-11: Planning Segment 2B—Designated Use Attainment Status and Water Quality Monitoring

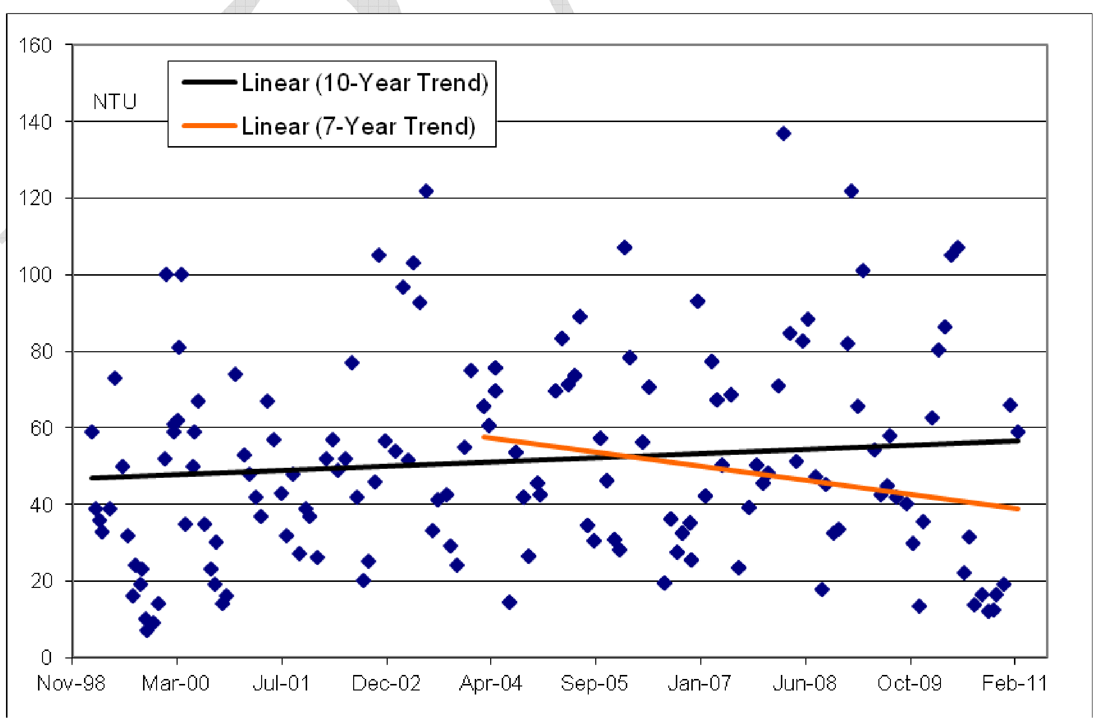
						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-2B																										
B. Bartholomew	8040205	-001	60.1	OUA0013	M	S	N	S	S	S	S	AG				Tb				4a				FISH CONSUMPTION	434.6	42.9
Wolf Creek	8040205	-701	10.8	OUA0156	M	S	S	S	S	S	S									1						
B. Bartholomew	8040205	-002	17.9	OUA0154	M	N	S	S	S	S	S	UN	SE			Hg	Tb			4a	4a			FISHERIES	97	380.5
Bearhouse Creek	8040205	-901	24.4	OUA0155	M	S	N	S	S	S	S	UN	UN			DO	Pb			5	4a			PRIMARY CONTACT	368.5	109
B. Bartholomew	8040205	-006	82.3	OUA0033	M	S	N	S	S	S	S	UN	AG			Pb	Tb			5	4a			SECONDARY CONTAC	477.5	0
Main Street Ditch	8040205	-909	2.0	OUA0146	M	S	N	S	S	S	S	UR	UR			DO	Pb			5	5			DRINKING SUPPLY	477.5	0
Harding Creek	8040205	-902	4.6	OUA0145	M	S	N	N	S	S	S	UR	UR			PA	Pb			4a	5			AGRI & INDUSTRY	477.5	0
Nevins Creek	8040205	-906	8.5	OUA0144	M	S	S	S	S	S	S									1						
Bayou Imbeau	8040205	-910	7.5	OUA0147	M	S	N	S	S	S	S	UR	UR			DO	Pb			5	5					
Melton's Creek	8040205	-903	8.7	OUA0148	M	S	S	N	S	S	S	UN				PA				4a						
Deep Bayou	8040205	-005	28.9	OUA0151	M	S	N	N	S	S	S	UN	SE			PA	Tb			4a	4a					
Jacks Bayou	8040205	-904	6.0	OUA0150	M	S	S	S	S	S	S									1						
Cross Bayou	8040205	-905	2.4	OUA0152	M	S	N	N	S	S	S	UN	UN			DO	PA			5	5					
Able's Creek	8040205	-911	14.6	OUA0158	M	S	S	S	S	S	S	SE				Tb				5						
B. Bartholomew	8040205	-912	82.7		E	S	N	S	S	S	S		UN	UN	AG		Cl	TDS	Tb		5	5	4a			
B. Bartholomew	8040205	-012	25.0	UWBYB02	M	N	N	S	S	S	S	SE	UN			Tb	Hg			4a	4a					
B. Bartholomew	8040205	-013	33.9	UWBYB03	M	S	N	N	S	S	S	SE	UN	UN	UN	Tb	DO	PA	CL	4a	5	4a	4a			
Cutoff Creek	8040205	-007	16.8	UWCOC01	M	S	N	S	S	S	S	SE	UN			Tb	Hg			4a	4a					
Cutoff Creek	8040205	-011	11.8	UWCOC02	M															1						
Chemin-A-Haut Creek	8040205	-907	30.5	OUA0012	M	S	S	N	S	S	S	UN	UN			DO	PA			5	4a					
Overflow Creek	8040205	-908	9.9	OUA0012A	M	S	N	S	S	S	S	UN	UN			Tb	Cl			5	5					
TOTAL MILES	489.3																									
MILES UNASSESSED	0																									
MILES EVALUATED	82.7																									
MILES MONITORED	406.6																									

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

Table A-12: Segment 2B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0021831	MONTICELLO, CITY OF-EAST PLANT	TRIB,GODFREY CR,LOWER CUTOFF CR, CUTOFF CR, BU BARTHOLOMEW	009	8040205	Drew	1
AR0022071	MCGEHEE, CITY OF	BU BARTHOLOMEW,OUACHITA RIVER	912	8040205	Desha	2
AR0022250	DERMOTT, CITY OF-SOUTH POND	BU BARTHOLOMEW,OUACHITA RV	912	8040205	Chicot	3
AR0034029	HAMBURG, CITY OF	CHEMIN-A-HAUT CR, OUACHITA RV	011	8040205	Ashley	4
AR0034371	PORTLAND, CITY OF	TRIB,BU BARTHOLOMEW,OUACHITA RV	002	8040205	Ashley	5
AR0037885	SUBURBAN SID NO. TANTARA #1 OF	BOGGY BU,BU BARTHOLOMEW,ARKANSAS RV	006	8040205	Jefferson	6
AR0039144	PINEWOOD SEWER IMPROVEMENT	TRIB,NEVINS CR,BU BARTHOLOMEW	006	8040205	Jefferson	7
AR0041602	SUBURBIA SID 1	UNNAMED TRIB NEVIN CR,BU BARTHOLOMEW, OUACHITA RV	006	8040205	Jefferson	8
AR0045888	ARK PARKS CANE CREEK	CANE CR LK, BU BARTHOLOMEW, OUACHITA RV	006	8040205	Lincoln	9
AR0046477	STAR CITY, CITY OF	CANE CR,BU BARTHOLOMEW,OUACHITA RV	006	8040205	Lincoln	10
AR0047350	PINE HAVEN MOBILE LODGE	TRIB,GODFREY CR,CUTOFF CR,BU BARTHO	011	8040205	Drew	11
AR0047872	ROBERT FLOYD SAWMILL, INC	TRIB,CANE CR,BU BARTHOLOMEW,OUACHITA RIVER	006	8040205	Lincoln	12
AR0050989	WILMOT, CITY OF	BU BARTHOLOMEW, OUACHITA RV	001	8040205	Ashley	13
AR0050997	PARKDALE, CITY OF	BAYOU BARTHOLOMEW	001	8040205	Ashley	14

Figure A-9: Bayou Bartholomew (OUA0013)
Turbidity 7- & 12-Year Trends



SEGMENT 2C SALINE RIVER AND TRIBUTARIES

Segment 2C is located in south central Arkansas and covers parts of Saline, Garland, Hot Spring, Grant, Dallas, 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

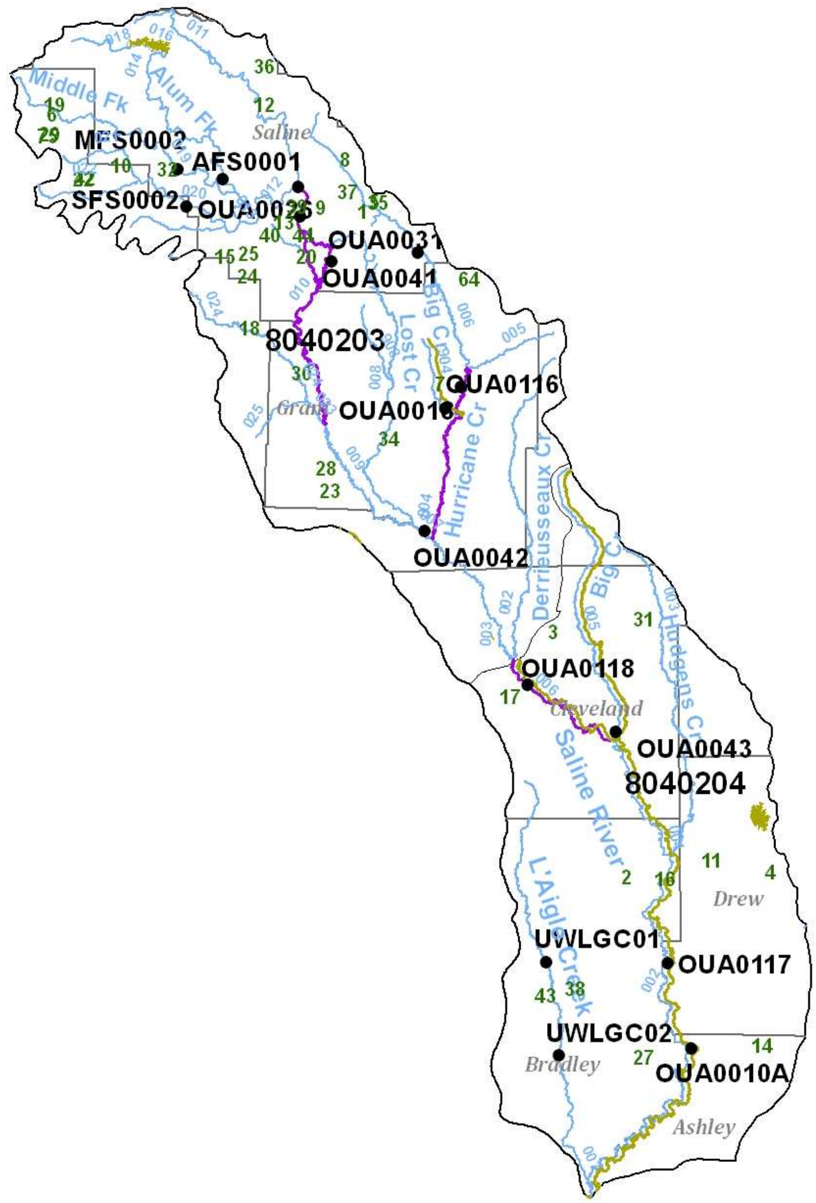
The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, and public, industrial, and agricultural water supplies. Slightly over one-half of the total stream miles within this segment are designated as Extraordinary Resource Waters. This includes the Saline River and its primary headwater tributaries.

The domestic water supply use has been removed from 83.8 stream miles in the Hurricane Creek sub-watershed because of excessive mineral content. The minerals (chlorides, sulfates, and other dissolved minerals) in this basin originate from the historic open pit bauxite mining.

Water quality in Big Creek below the City of Sheridan effluent has improved, yet dissolved oxygen violations still occur as well as elevated BOD and TOC levels. A TMDL was completed for dissolved oxygen in Big Creek in 2007. This stream is classified as a seasonal fishery and the critical season dissolved oxygen standard is 2.0 mg/L to prevent nuisance conditions. Many small seasonal streams in this ecoregion have dissolved oxygen levels below 2.0 mg/L during the critical season.

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

Figure A-10: Planning Segment 2C



(Segment 2C)

Figure A-11: Planning Segment 2C Inset

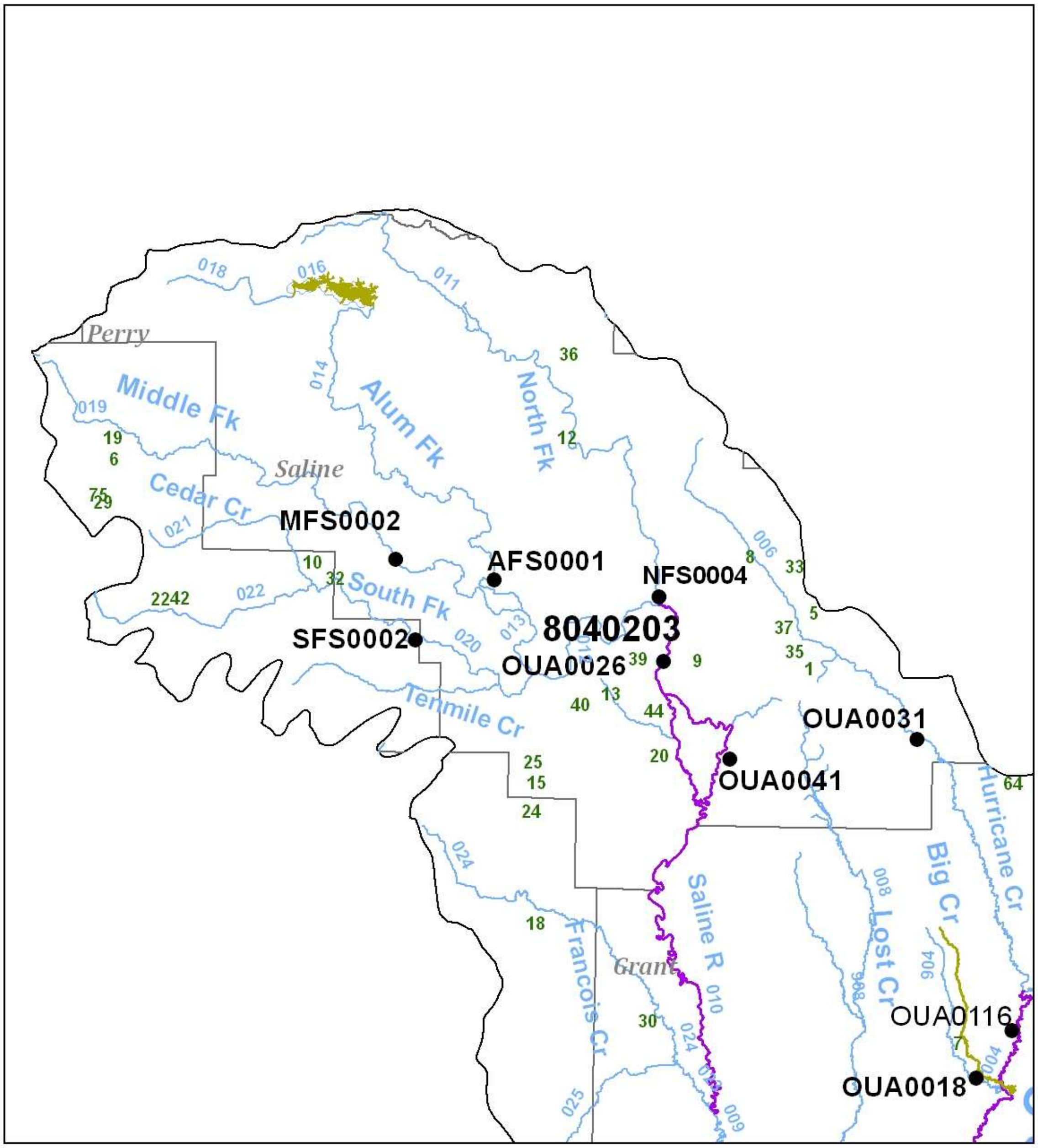


Table A-13: Planning Segment 2C—Designated Use Attainment Status and Water Quality Monitoring

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use						SOURCE				CAUSE				STATUS			
						FC	FSH	PC	SC	DW	AI	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			
Derrieusseaux	8040203	-002	34.3	OUA0166	E	S	S	S	S	S	S												
Saline River	8040203	-003	17.2		E	S	S	S	S	S	S												
Hurricane Cr.	8040203	-004	19.5	OUA0116	M	S	S	S	S	S	S	TDS				RE							
Simpson Creek	8040203	-005	12.3		E	S	S	S	S	S	S												
Hurricane Cr.	8040203	-006	30.8	OUA0031	M	S	S	S	S	S	S												
Saline River	8040203	-007	3.8	OUA0042	M	S	S	S	S	S	S												
Lost Creek	8040203	-008	33.5		U	S	S	S	S	S	S												
Saline River	8040203	-009	15.6		U	S	S	S	S	S	S												
Saline River	8040203	-010	29.8	OUA0026,41	M	S	N	S	S	S	S	SE	UN			Tb	TDS			5	5		
N. Fork Saline	8040203	-011	23.2	NFS01	M	S	S	S	S	S	S												
Saline River	8040203	-012	10.2		E	S	S	S	S	S	S												
Saline River	8040203	-013	4.0		E	S	S	S	S	S	S												
Alum Fork	8040203	-014	24.6	AFS01	M	S	S	S	S	S	S												
Alum Fork	8040203	-015	3.2		E	S	S	S	S	S	S												
Alum Fork	8040203	-018	10.0		E	S	S	S	S	S	S												
M. Fork Saline	8040203	-019	30.9	MFS01	M	S	S	S	S	S	S												
S. Fork Saline	8040203	-020	14.9	SFS01	M	S	S	S	S	S	S												
Cedar Creek	8040203	-021	9.1		E	S	S	S	S	S	S												
S. Fork Saline	8040203	-022	10.9		E	S	S	S	S	S	S												
Francois Cr.	8040203	-023	2.9		E	S	S	S	S	S	S												
Francois Cr.	8040203	-024	14.9		E	S	S	S	S	S	S												
Huskey Creek	8040203	-025	11.0		E	S	S	S	S	S	S												
Big Creek	8040203	-904	10.0	OUA0018	M	S	N	S	S	S	S	UN	SE	MP		DO	Tb	OE		4a	4a	4a	
Saline River	8040204	-001	2.8		E	N	S	S	S	S	S	UN				Hg				4a			
Saline River	8040204	-002	53.0	OUA0010A,117	M	N	S	S	S	S	S	UN				Hg				4a			
Saline River	8040204	-004	16.4		E	N	S	S	S	S	S	UN				Hg				4a			
Saline River	8040204	-006	17.5	OUA0118	M	N	S	S	S	S	S	UN	SE	SE		Hg	TDS	Tb		4a	5	5	
Hudgens Creek	8040204	-003	36.7	OUA0167	M	S	S	S	S	S	S												
Big Creek	8040204	-005	28.9	OUA0043	M	S	N	S	S	S	S	SE				Tb				4a			
L'Aigle Creek	8040204	-007	44.2	UWLGC01,02	M	S	S	S	S	S	S												
TOTAL MILES	576.3																						
MILES UNASSESSED	49.1																						
MILES EVALUATED	159.4																						
MILES MONITORED	367.8																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	486.4	89.9
FISHERIES	507.6	68.7
PRIMARY CONTACT	576.3	0
SECONDARY CONTACT	576.3	0
DRINKING SUPPLY	576.3	0
AGRI & INDUSTRY	576.3	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
OUA0166	Derrieusseaux Creek at Highway 35 northwest of Rison		2	R
OUA0116	Hurricane Creek at Highway 270 bridge	Y	1	A
OUA0031	Hurricane Creek near Sardis	Y	1	A
OUA0042	Saline River at Highway 167 near Sheridan	Y	1	A
OUA0026	Saline River near Benton	Y	1	A
OUA0041	Saline River at Shaw Bridge south of Benton	Y	1	A
NFS02	North Fork Saline River near Benton		1	R
AFS01	Alum Fork Saline River at Highway 5 east of Crows		1	R
MFS01	Middle Fork Saline River at county road south of Crows		1	R
SFS01	South fork Saline River on county road north of Nance off US 70		2	R
OUA0018	Big Creek below Sheridan		1	A
OUA0010A	Saline Rive near Fountain Hill	Y	1	A
OUA0117	Saline River at Ozment Bluff	Y	1	A
OUA0118	Saline River at Highway 79 bridge	Y	1	A
OUA0167	Hudgens Creek at Highway 35 east of Rye		2	R
OUA0043	Big Creek at Highway 35 northwest of Sheridan		1	A
UWLGC01	L'Aigle Creek at Farmville Road, 2 miles southeast of Farmville		2	R
UWLGC02	L'Aigle Creek at county road, 2.5 miles west of Ingalls		2	R

Table A-14: Segment 2C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0000582	ALCOA INC - BAUXITE	HURRICANE CR (008,028);HOLLY CR(009)	003	8040203	Saline	1
AR0000914	POTLATCH LAND AND LUMBER, LLC - WARREN LUMBER	TRIB,FRANKLIN CR,SALINE R,OUACHITA R	002	8040204	Bradley	2
AR0021695	RISON, CITY OF	TRIB,HARRISON CR,SALINE RV,OUACHITA RV	006	8040204	Cleveland	3
AR0021822	MONTICELLO, CITY OF-WEST PLANT	TENMILE CR,SALINE RV,OUACHITA RV	002	8040204	Drew	4
AR0034002	BRYANT, CITY OF	TRIB,HURRICANE CK,SALINE RV,OUACHITA RV	006	8040203	Saline	5
AR0034291	HOT SPRINGS VILLAGE POA-MILL CREEK WWTP	MILL CR,MIDDLE FK,ALUM FK,SALINE R,OUACHITA RV	019	8040203	Garland	6
AR0034347	SHERIDAN, CITY OF-WWTF	BIG CR,HURRICANE CR,SALINE R,OUACHITA R	904	8040203	Grant	7
AR0035955	BRYANT PUB SCHOOL-SALEM ELEMEM	TRIB,HURRICANE CR,SALINE RV,OUACHITA RV	006	8040203	Saline	8
AR0036498	BENTON, CITY OF	TRIB,DEPOT CR,SALINE RV	010	8040203	Saline	9
AR0039284	HOT SPRINGS VILLAGE POA-CEDAR CREEK WWTP	CEDAR CR,SOUTH FK SALINE R,SALINE R,OUACHITA RV	021	8040203	Garland	10
AR0040096	WILMAR, CITY OF	FLAT BRANCH CR,TEN MILE CR,SALINE R,OUACHITA RV	002	8040204	Drew	11
AR0041416	TIMBER RIDGE RANCH NEUROREHABI	DOG CR,N FK SALINE RV,SALINE RV	011	8040203	Saline	12
AR0042277	PAWNEE VILLAGE POA	TRIB,TRACE CR,SALIVE RV	010	8040203	Saline	13
AR0042421	FOUNTAIN HILL, CITY OF	TRIB,FLAT CR,SALINE RV	002	8040204	Ashley	14
AR0042889	JJ'S TRUCK STOP, INC	TRIB,BRUSHY CR,FRANCOIS CR,SALINE RV	024	8040203	Saline	15
AR0043427	WARREN WATER & SEWER, CITY OF	SALINE RV,OUACHITA RV	002	8040204	Bradley	16
AR0043672	KINGSLAND, CITY OF	PANTHER CR,SALINE RV,OUACHITA RV	006	8040204	Cleveland	17
AR0044105	FLAKEBOARD AMERICA LIMITED	TRIB,BIG CR,SALINE RV,OUACHITA RV	024	8040203	Hot Spring	18
AR0044423	JESSIEVILLE PUBLIC SCHOOL	TRIB,COLEMAN CR,SALINE RV	019	8040203	Garland	19
AR0044547	HASKELL, CITY OF	UNNAMED CR,TRACE CR,SALINE R,OUACHITA RV	010	8040203	Saline	20
AR0045047	VILLAGE SQUARE SHOPPING CENTER	TRIB,MILL CR,SALINE RV	019	8040203	Garland	21
AR0046141	MTN VALLEY RETREAT CENTER	TRIB,S FK SALINE RV,SALINE RV	022	8040203	Garland	22
AR0046698	WEST FRASER, INC.	TRIB,SALINE RV,OUACHITA RV	009	8040203	Grant	23
AR0046817	GLEN ROSE SCHOOL DIST	TRIB,10-MILE CR, FRANCOIS CR, SALINE RV	024	8040203	Hot Spring	24
AR0047431	CHURCH OF GOD IN ARKANSAS d/b/a PATHWAY CAMP GROUND	TRIB,BRUSHY CR,FRANCOIS CR,SALINE RV,OUACHITA RV	024	8040203	Saline	25
AR0047732	J.P. PRICE LUMBER CO	TRIB OF CLEAR CR, CLEAR CR, SALINE RV, OUACHITA RV	002	8040204	Drew	26
AR0047830	JOHNSVILLE COMPANY, LLC	HUNT BR,SALINE R,OUCHITA RV	002	8040204	Bradley	27
AR0047902	H.G. TOLER & SON LUMBER COMPANY	TRIB,SALINE RV,OUACHITA RV	009	8040203	Grant	28
AR0048194	N GARLAND COUNTY BOYS & GIRLS	TRIB,COLEMAN CR,MID FK SALINE RV	019	8040203	Garland	29
AR0048445	POYEN, CITY OF-WWTP	TRIB,BIG CR,FRANCOIS CR,SALINE RV,OUACHITA RV	025	8040203	Grant	30
AR0048569	WOODLAWN SCHOOL DISTRICT # 6	TRIB,HUDGIN CR,SALINE RV	003	8040204	Cleveland	31
AR0049328	SALINE CO.PROP. IMPROV DIST# 37	TRIB,SOUTH FORK SALINE R,SALINE RV	020	8040203	Saline	32
AR0049522	FREDS STORE/COMMERCIAL PARK	TRIB,HURRICANE CR,SALINE RV	006	8040203	Saline	33
AR0049751	SHERIDAN WHITE ROCK, INC	TRB,LOST CR,SAL RV,OUACHITA RV BAS.	008	8040203	Grant	34
AR0049786	BAUXITE, AR WWTF	TRIB,HURRICANE CR,SALINE R,OUACHITA RV	006	8040203	Saline	35
AR0050202	DESTINED TO WIN/FAMILY OUTREACH	TRIB,N FK SALINE R,SALINE R.OUACHITA RV	011	8040203	Saline	36
AR0050270	ALMATIS, INC.	HURRICANE CR,SALINE RV,OUACHITA RV	006	8040203	Saline	37
AR0050300	OASIS TRADING CO., LLC	TRIB,L'AIGLE CR,SALINE RV,OUACHITA RV	007	8040204	Bradley	38
AR0050326	CENTRAL ARKANSAS UTILITY SERVICES-REUNION	TRIB,SALINE RV,OUACHITA RV	010	8040203	Saline	39
AR0050563	CENTRAL ARK UTILITY-CROSSROADS	TRIB,CLIFT CR,SALINE RV	010	8040203	Saline	40
AR0050601	BANKS, CITY OF	TRIN,L'AIGLE CR,SALINE RV,OUACHITA	007	8040204	Bradley	41
AR0050750	FOUNTAIN LAKE HEALTHCARE/REHAB	S FK / SALINE R,SALINE RV,OUACHITA RV	022	8040203	Garland	42
AR0051055	HERMITAGE, CITY OF	BIG TOWN CR, L'AIGLE CR, SALINE RV, OUACHITA RV	007	8040204	Bradley	43
AR0051713	HASKELL, CITY OF - NORTH WWTP	DODSON CR, SALINE RV, OUACHITA RV	910	8040203	Saline	44

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SEGMENT 2D LOWER OUACHITA RIVER AND TRIBUTARIES

Segment 2D occupies the south central part of Arkansas covering Calhoun, Bradley, Dallas, Ouachita, Cleveland, Columbia, Ashley, Nevada, and Union Counties. It 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 propagation of fish and wildlife; primary and secondary contact recreation; and public, industrial, and agricultural water supplies.

The Lower Ouachita River, Champagnolle, and Moro Creeks have fish consumption advisories because of mercury contamination. 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 was completed in 2002 for mercury in the lower Ouachita River Basin in Arkansas and Louisiana.

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

Some of the most severe water quality problems exist in the unnamed tributary from El Dorado Chemical Company (ELCC), Flat Creek, and Salt Creek. The ELCC tributary contains ammonia at toxic levels; elevated nitrates, minerals (sulfates and total dissolved solids) and copper concentrations. The source is from the El Dorado Chemical Company discharge. Flat Creek and Salt Creek have elevated minerals (chlorides, sulfates, total dissolved solids) and ammonia concentrations. The exact source is unknown, but these streams drain basins from the northern edge of El Dorado where numerous oil and brine processing and storage facilities exist along with numerous abandoned pumping facilities. These streams enter Smackover Creek below the ambient monitoring station. TMDLs were completed in October 2002 and in October 2003. Both point source and nonpoint source controls are needed to address these issues.

Copper continues to show elevated concentrations above the toxic levels. This seems to be a trend throughout the Gulf Coastal Plains. The waters in the Gulf Coastal Plains generally have low hardness values, typically less than 25 mg/L.

Figure A-12: Planning Segment 2D

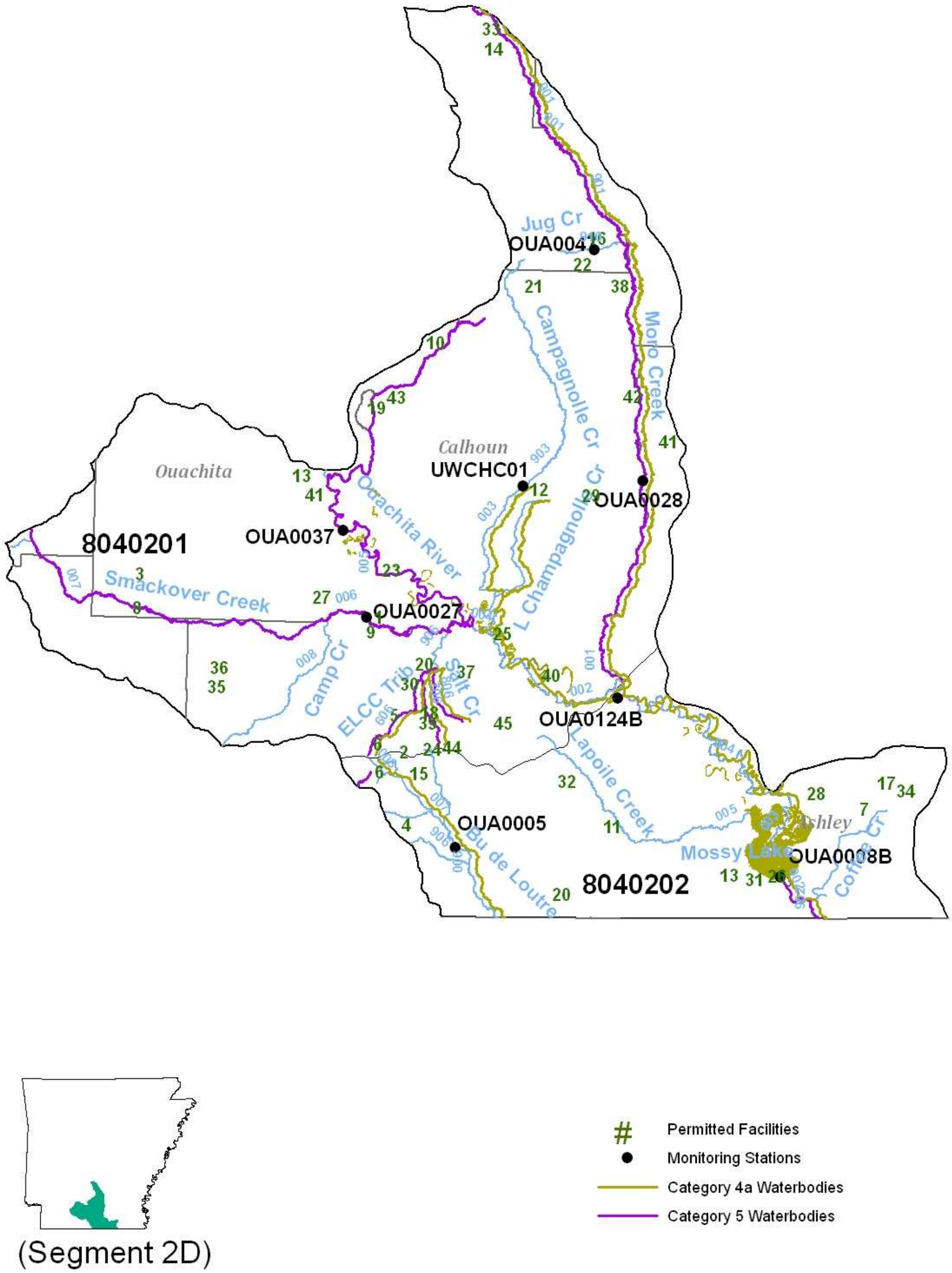

Table A-15: Planning Segment 2D—Designated Use Attainment Status and Water Quality Monitoring

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-2D																										
Ouachita River	8040202	-002	4.0	OUA0008B	M	N	N	S	S	S	S	UN	UN			Hg	Tb			4a	5			FISH CONSUMPTION	305.7	119.2
Ouachita River	8040202	-003	8.4		M	N	S	S	S	S	S	UN				Hg				4a				FISHERIES	190.5	234.4
Ouachita River	8040202	-004	28.9	OUA0124B	M	N	S	S	S	S	S	UN				Hg				4a				PRIMARY CONTACT	394.2	30.7
Lapile Creek	8040202	-005	25.3		U	S	S	S	S	S	S									3				SECONDARY CONTACT	424.9	0.0
B. De L'Outre	8040202	-006	32.4	OUA0005	M	S	N	S	S	S	S	IP	MP			SO4	TDS			4a	4a			DRINKING SUPPLY	424.9	0
B. De L'Outre	8040202	-007	6.9		E	S	N	S	S	S	S	IP	MP			SO4	TDS			4a	4a			AGRI & INDUSTRY	424.9	0.0
B. De L'Outre	8040202	-008	10.6		E	S	N	S	S	S	S	IP	MP			SO4	TDS			4a	4a					
Moro Creek	8040201	-901	57.9		E	S	N	S	S	S	S	UN	UN	SE		Cu	Pb	Tb		5	5	4a				
Moro Creek	8040201	-001	12.0	OUA0028	M	N	N	S	S	S	S	UN	UN	SE	UN	Cu	Pb	Tb	Hg	5	5	4a	4a			
Ouachita River	8040201	-002	22.5		M	N	S	S	S	S	S	UN				Hg				4a						
Ouachita River	8040201	-004	2.5		M	N	S	S	S	S	S	UN				Hg				4a						
Ouachita River	8040201	-005	34.2	OUA0037	M	S	N	S	S	S	S	UN				Cu				5						
l. Champagnolle	8040201	-903	20.9		E	N	S	S	S	S	S	UN				Hg				4a						
Champagnolle	8040201	-003	20.0	UWCHC01	M	N	S	S	S	S	S	UN				Hg				4a						
Smackover Cr.	8040201	-006	14.8	OUA0027	M	S	N	S	S	S	S	UN				DO				5						
Smackover Cr.	8040201	-007	29.1		E	S	N	S	S	S	S	UN				DO				5						
Camp Creek	8040201	-008	13.3		U	S	S	S	S	S	S									3						
Elcc Trib.	8040201	-606	8.5	OUA0137A+	M	S	N	S	S	S	S	MP	MP	MP		pH	Cu	*		5	5	4a				
Flat Cr.	8040201	-706	16.0	OUA0137C	M	S	N	S	S	S	S	IP				pH			*	5			4a			
Salt Cr.	8040201	-806	8.0	OUA0137D	M	S	N	S	S	S	S	IP				pH			*	5			4a			
Haynes Cr.	8040201	-906	10.0		U	S	S	S	S	S	S									3						
Jug Creek	8040201	-910	8.0	OUA0047	M	S	S	S	S	S	S									3						
E. Two Bayou	8040201	-905	30.7	OUA0052B	M	S	S	N	S	S	S	UN				PA				5						
TOTAL MILES	394.2																									
MILES UNASSESSEI	48.6																									
MILES EVALUATED	125.4																									
MILES MONITORED	220.2																									

*=TMDLs for AM, CL, SO4, &TDS.

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

Table A-16: Segment 2D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0000591	MARTIN OPERATING PARTNERSHIP, L.P.	SMACKOVER CR (1-3) & HOLMES CK (4)	006	8040201	Union	1
AR0000647	LION OIL COMPANY-EL DORADO REF	1-7: LOUTRE CR; 010: OUACHITA RV	008	8040202	Union	2
AR0000663	BERRY PETROLEUM CO-STEPHENS	TRIB,SMACKOVER CR,OUACHITA RV	007	8040201	Ouachita	3
AR0000680	GREAT LAKES CHEMICAL CORPORATION-SOUTH	GUM CR-2D (1) & WALKER CR-2E (2,3)	007	8040202	Union	4
AR0000752	EL DORADO CHEMICAL CO, INC	TRIB,FLAT CR,HAYNES CR,OUACHITA RV	606	80402020	Union	5
AR0001171	GREAT LAKES CHEMICAL CORPORATION-CENTRAL PLNT	BU DE LOUTRE;LTL CORNIE BU;OUACHITA	007	8040202	Union	6
AR0001210	GEORGIA-PACIFIC, LLC-CROSSETT	OUACHITA RV	902	8040202	Ashley	7
AR0020168	STEPHENS, CITY OF	SMACKOVER CR,OUACHITA RV	007	8040201	Ouachita	8
AR0021440	SMACKOVER WTF	SMACKOVER CR,OUACHITA RV	006	80402010	Union	9
AR0021474	BEARDEN, CITY OF	EAST TWO BAYOU CR,OUACHITA RV	005	8040201	Ouachita	10
AR0021687	STRONG, CITY OF	LAPILE CR,OUACHITA RV	005	8040202	Union	11
AR0021873	HAMPTON, CITY OF	CHAMPAGNOLLE CR, OUACHITA RIVER	003	8040201	Calhoun	12
AR0022268	HUTTIG, CITY OF	OUACHITA RV	002	8040202	Union	13
AR0033715	CARTHAGE, CITY OF	MORO CR TRIB, OUACHITA RV	001	8040201	Dallas	14
AR0033723	EL DORADO WATER - SOUTH PLANT	BU DE LOUTRE,OUACHITA RV	007	8040202	Union	15
AR0033758	FORDYCE, CITY OF	JUG CR,MORO CR,OUACHITA RV	901	8040201	Dallas	16
AR0033812	N CROSSETT UTILITIES	TRIB,LTL BRUSHY CR, BIG BRUSHY CR,SALINE RV, QUACH	002	8040202	Ashley	17
AR0033936	EL DORADO WATER - NORTH PLANT	TRIB,FLAT CR,HAYNES CR,SMACKOVER CR, OUACHITA RV	706	8040201	Union	18
AR0034363	SHUMAKER PUBLIC SERVICE CORP	UNNAMED TRIB; TWO BAYOU CR; OUACHITA RIVER	005	8040201	Calhoun	19
AR0035653	NORPHLET, CITY OF	UNNAMED TRIB FLAT CR,HAYNER CR,SMACKOVER CR	606	8040201	Union	20
AR0035661	THORNTON, CITY OF	TURNERS CR,CHAMPAGNOLLE CR,OUACHITA	003	8040201	Calhoun	21
AR0036064	GEORGIA PACIFIC WOOD PRODUCTS LLC	TRIB,JUG CR,MORO CR,OUACHITA RV	901	80402010	Dallas	22
AR0037761	LIBERTY BAPT ASSN-DBA BEECH SP	UNNAMED TRIB,OUACHITA RV	005	80402012	Ouachita	23
AR0037800	CLEAN HARBORS EL DORADO, LLC	BOGGY CR,BU DELOUTRE,OUACHITA RB	007	8040202	Union	24
AR0038211	CALION, CITY OF	CHAPELLE SLU,OUACHITA RV	002	8040201	Union	25
AR0039659	FELSENTHAL, TOWN OF	WOLF SLOUGH TO BUCKHORN SLOUGH, OUACHITA RV	002	8040202	Union	26
AR0040517	LOUANN, CITY OF	BRUSHY CR,SMACKOVER CR,OUACHITA RIVER	007	8040201	Ouachita	27
AR0042315	CROSSETT HARBOR PORT AUTHORITY	OUACHITA RV	003	8040202	Ashley	28
AR0042609	HARRELL, CITY OF	SPRING BR,BLANN CR,LLOYD CR,MORO CR	001	8040201	Calhoun	29
AR0044733	CEDARWOOD LEISURE PARK, LLC	TRIB,FLAT CR,HAYNES CR,SMACKOVER CR, OUACHITA RV	606	8040201	Union	30
AR0046116	WEST FRASER, INC. - SOUTH	DOLLAR SLU (1,); BUCKHORN SLU (4)	003	80402020	Union	31
AR0047384	ANTHONY FOREST PRODUCTS COMPAN	N LAPILE CR,LAPILE CR OUACHITA RV	005	8040202	Union	32
AR0047503	IDAHO TIMBER CORP. OF CARTHAGE, LLC	TRIB,MORO CR,SALINE RV,OUCHITA RV	001	8040201	Dallas	33
AR0048097	GEORGIA PACIFIC, LLC-N LOG YRD	TRIB,LTL BRUSHY CR,BRUSHY CR	003	8040202	Ashley	34
AR0048381	WATSON SAWMILL, INC.	TRIB,BEECH CR,SMACKOVER CR,OUACHITA	007	8040201	Union	35
AR0049123	JIM YEAGER - d/b/a YEAGER APARTMENTS	TRIB,DRY CR,BEECH CR,SMACKOVER CR,OUACHITA RV	007	8040201	Union	36

Table A-16 (cont.): Segment 2D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0049140	UNION POWER PARTNERS, LP - UNION POWER STATION	OUACHITA RV	002	8040201	Union	37
AR0049204	GEORGIA PACIFIC CORPORATION - FORDYCE OSB FAC	UNNAMED TRIB,MORO CR,OUACHITA RIVER	001	80204012	Calhoun	38
AR0049743	EL DORADO WATER UTILITIES	OUACHITA RV	706	8040201	Union	39
AR0050296	EL DORADO WATER UTILITIES JOINT PIPELINE	OUACHITA RV	002	8040201	Union	40
AR0050482	VICTORY LUMBER, LLC	UNNAMED TRIB,MILL CR,TWO BU,OUACHITA RIVER	005	8040201	Ouachita	41
AR0050661	TINSMAN, CITY OF	WATSON CR,MORO CR,OUACHITA RV	001	8040201	Calhoun	42
AR0051071	AEROJET - GENERAL CORP.	TRIB, TWO BU, OUACHITA RV	005	8040201	Calhoun	43
AR0051420	SOUTHERN MUD COMPANY, LLC	TRIB, BOGGY CR, BUDE LOUTRE, OUACHITA RV	907	8040202	Union	44
AR0051811	EL DORADO PUBLIC SCHOOLS - OLD UNION SCHOOL	TRIB,MILL CR,OUACHITA RV	002	80402011	Union	45

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Segment 2E Upper Cornie Bayou and Tributaries

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

Summary of Water Quality Conditions

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.

Sulfates and zinc continue to be the major causes of impairment to all of the waters within this basin. Siltation was added most recently as impairing the Fisheries Designated use to the streams in this basin with resource extraction listed as the source. Additional assessment and reclamation activities are needed to address these issues.

All assessed waters in this segment have been evaluated as not meeting the water quality standards for turbidity, sulfates and zinc. The source of these pollutants has been identified as resource extraction activities.

Figure A-13: Planning Segment 2E

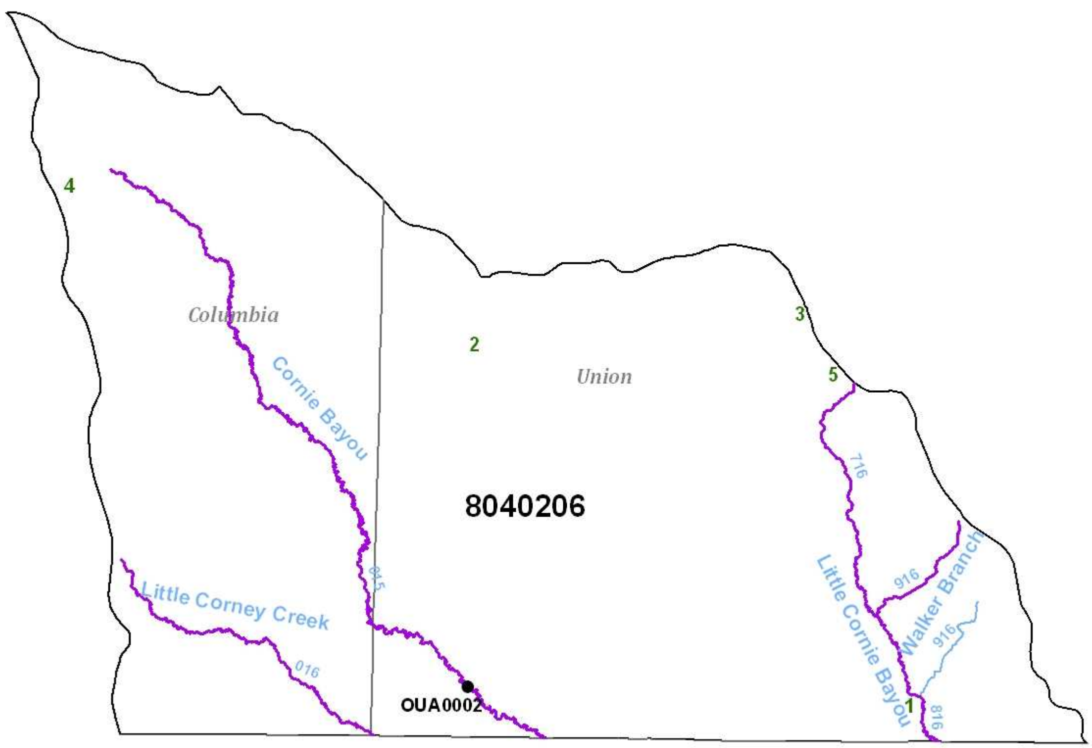


Table A-17: Planning Segment 2E—Designated Use Attainment Status and Water Quality Monitoring

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-2E																								FISH CONSUMPTION	44.0	0.0
Big Cornie Cr.	8040206	-015	15.0	OUA0002	M	S	N	S	S	S	S	RE	RE	RE		Tb	SO4	Zn		5	5	5		FISHERIES	0.0	44.0
Little Cornie Cr.	8040206	-016	18.0		E	S	N	S	S	S	S	RE	RE	RE		Tb	SO4	Zn		5	5	5		PRIMARY CONTACT	44.0	0.0
Little Cornie Bayou	8040206	-716	5.0		E	S	N	S	S	S	S	RE	RE	RE		Tb	SO4	Zn		5	5	5		SECONDARY CONTACT	44.0	0.0
Little Cornie Bayou	8040206	-816	3.0		E	S	N	S	S	S	S	RE	RE	RE		Tb	SO4	Zn		5	5	5		DRINKING SUPPLY	44.0	0.0
Walker Branch	8040206	-916	3.0		E	S	N	S	S	S	S	RE	RE	RE		Tb	SO4	Zn		5	5	5		AGRI & INDUSTRY	44.0	0.0

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

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

Table A-18: Segment 2E Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0022179	JUNCTION CITY, CITY OF	LTL CORNIE BU	816	8040206	Union	1
AR0043516	GREAT LAKES CHEMICAL CORP-WEST PLNT	SEWELL CR,W THREE CRS,THREE CRS,...	015	8040206	Union	2
AR0047813	OAK MANOR WATER & WASTEWATER P.F.B.	JAYDISON SPRING BR,DRY CR,LTL CORNIE BU,OUACHITA	716	80402060	Union	3
AR0047945	GUNNELS MILL, INC	TRIB,LTL CORNIE BU,CORNIE CR	015	8040206	Columbia	4
AR0048461	DEL-TIN FIBER L.L.C.	TRIB,CORNIE CR,OUACHITA RV	716	8040206	Union	5
AR0049182	WILLIAM R. GAUNT PROPERTIES	TRIB,FLAT CR,HAYNES CR,SMACKOVER CR	606	8040206	Union	6

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 and portions of Clark, Dallas, Pike, Polk, Yell, Perry, Calhoun, 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

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. Approximately 36 percent of the waters within this segment are designated as Extraordinary Resource Waters. Water quality in Segment 2F is generally good and trends seem to indicate it is improving.

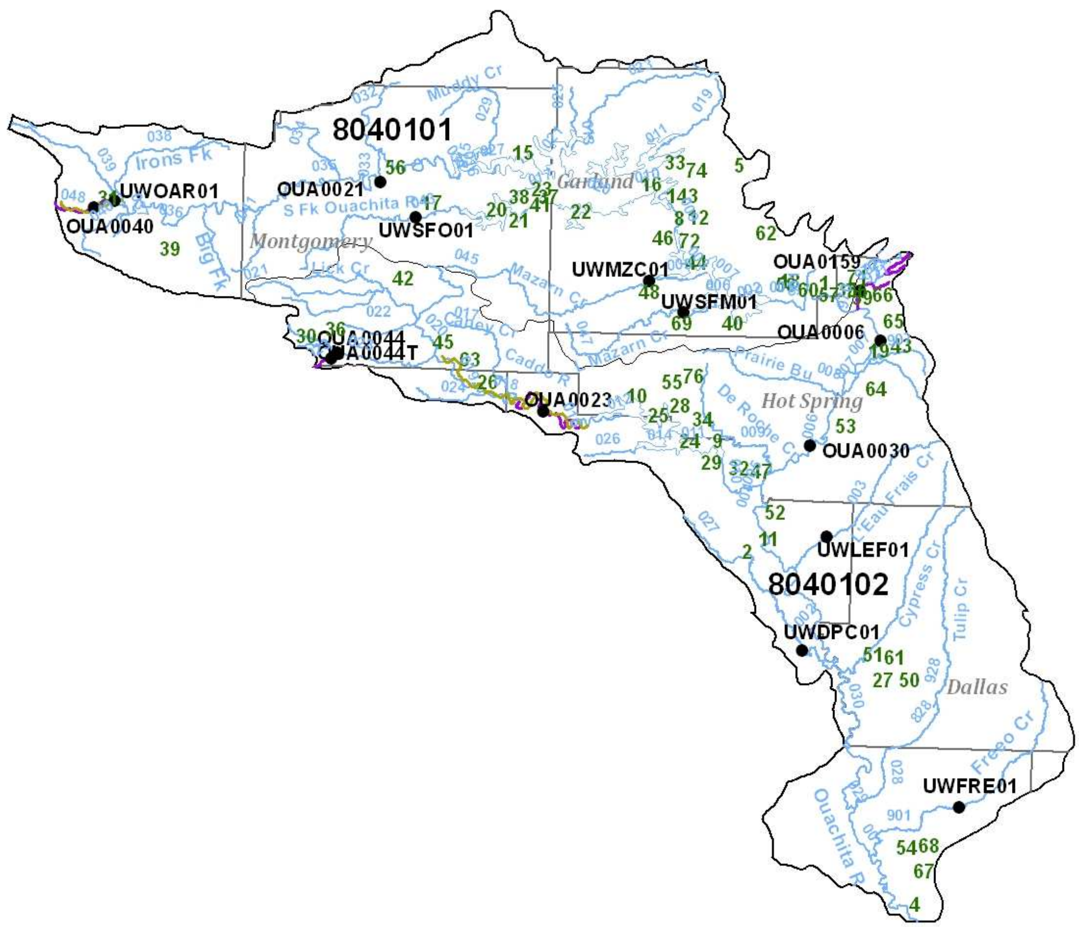
South Fork of the Caddo and Caddo River downstream of the South Fork are not meeting water quality standards for copper and/or zinc. The source is thought to be from abandoned open pit mining.

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

Prairie Creek below the City of Mena was assessed as not meeting the water quality standards for copper and turbidity. Surface erosion, including storm water runoff from industrial sites in the watershed, is listed as the source of the contaminants.

Several streams in this segment (Mazarn, Little Mazarn, Deceiper, Freeo, White Oak, Tulip, and Cypress Creeks) were previously listed as not attaining the pH water quality standard. Exceedances are less than the water quality standard of 6.0 standard units. These exceedances typically occur from late fall to early spring when water temperatures are low and instream assimilation activities are reduced. Most readings are above 5.5 standard units. Two of the streams listed as not attaining the pH water quality standard are original least-disturbed ecoregion reference streams. As noted earlier, Arkansas's pH standards are based on aquatic life studies occurring in a laboratory setting and do not reflect actual in-stream ambient conditions. Also, all of the exceedances are considered to be from naturally occurring conditions and not the result of a man-induced discharge.

Figure A-14: Planning Segment 2F



(Segment 2F)

Figure A-15: Planning Segment 2F Inset

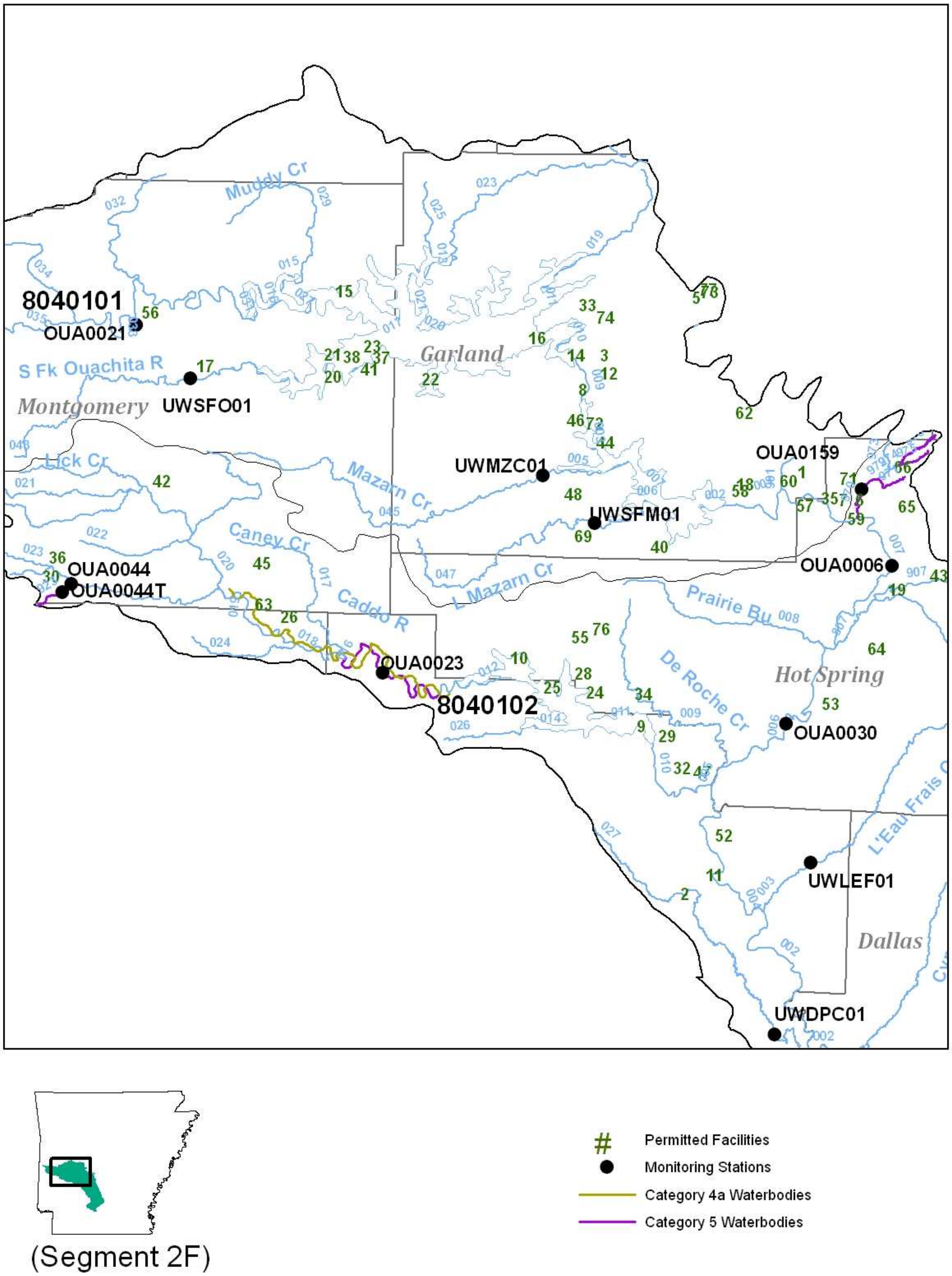


Table A-19: Planning Segment 2F—Designated Use Attainment Status and Water Quality Monitoring

						Designated Use						SOURCE				CAUSE				STATUS			
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4
SEG-2F																							
Ouachita River	8040102	-001	15.6	OUA0165	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-002	16.9		E	S	S	S	S	S	S									1			
L'Eau Frais C.	8040102	-003	21.5	UWLEF01	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-004	15.8		E	S	S	S	S	S	S									1			
Ouachita River	8040102	-005	0.6		E	S	S	S	S	S	S									1			
Ouachita River	8040102	-006	12.1	OUA0030	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-007	14.5	OUA0006A+	M	S	S	S	S	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	OUA0023	M	S	N	S	S	S	S	RE				SI				5			
Caney Creek	8040102	-017	12.5		U															3			
Caddo River	8040102	-018	4.1		E	S	S	S	S	S	S									1			
Caddo River	8040102	-019	7.7		E	S	S	S	S	S	S									1			
Caddo River	8040102	-020	4.1		U															3			
Caddo River	8040102	-021	15.9		U															3			
Mill Creek	8040102	-022	7.3		E	S	S	S	S	S	S									1			
S. Fork Caddo	8040102	-023	16.6	OUA0044	M	S	S	S	S	S	S	RE	RE			Cu	Zn			4a	4a		
D.C. Creek	8040102	-923	5.0	OUA0044T	M	S	S	S	S	S	S	RE				Zn				5			
Rock Creek	8040102	-024	8.1		E	S	S	S	S	S	S									1			
Brushy Creek	8040102	-026	6.9		E	S	S	S	S	S	S									1			
Deceiper Cr.	8040102	-027	24.4	UWDPC01	M	S	S	S	S	S	S									1			
Bayou Freeo	8040102	-901	33.9	UWFRE01	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-029	13.3		E	S	S	S	S	S	S									1			
White Oak Creek	8040102			OUA0168	M	S	S	S	S	S	S									1			
Tulip Creek	8040102	-028	20.0	OUA0169+	M	S	S	S	S	S	S									1			
Tulip Creek	8040102	-928	20.0		M	S	S	S	S	S	S									1			
Cypress Creek	8040102	-801	30.0	OUA0170	M	S	S	S	S	S	S									1			
Ouachita River	8040102	-030	12.0		E	S	S	S	S	S	S									1			
Cove Creek	8040102	-976	3.6	OUA0171C	M	S	S	S	S	S	S	UN				pH				5			
Lucinda Creek	8040102	-975	2.2	OUA0171B	M	S	N	S	S	S	S	RE	RE	RE	RE	pH	Al	Cu	Zn	5	5	5	5
Cove Creek	8040102	-974	0.7		E	S	S	S	S	S	S									1			
Basin Creek	8040102	-973	1.4	OUA0171D	M	S	S	S	S	S	S									1			
Cove Creek	8040102	-972	1.1		E	S	S	S	S	S	S									1			
Chamberlain Creek	8040102	-971	2.5	OUA0104	M	S	N	S	S	N	N	IP	RE			pH	SO4	TDS	ME	5	5	5	5
Cove Creek	8040102	-970	7.8	OUA0159	M	S	N	S	S	N	N	IP	RE	RE		pH	SO4	TDS	Cu	5	5	5	3
Ouachita River	8040101	-001	10.4		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-009	2.7		E	S	S	S	S	S	S									1			
Blakely Creek	8040101	-019	8.3		E	S	S	S	S	S	S									1			
N. Fork Ouachita	8040101	-023	10.9		E	S	S	S	S	S	S									1			
Irons Fork	8040101	-025	4.8		E	S	S	S	S	S	S									1			
Muddy Creek	8040101	-029	15.3		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-031	14.4		E	S	S	S	S	S	S									1			
Fiddlers Cr.	8040101	-032	10.6		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-033	11.9	OUA0021	M	S	S	S	S	S	S									1			
Ouachita River	8040101	-035	10.2		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-036	24.1	UWOAR01	M	S	S	S	S	S	S									1			
Bushy Creek	8040101	-034	12.1		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-037	0.7		E	S	S	S	S	S	S									1			
Ouachita River	8040101	-039	11.0	UWOAR01	M	S	S	S	S	S	S									1			
Iron Fork	8040101	-038	17.3		E	S	S	S	S	S	S									1			
Carters Creek	8040101	-040	9.0		U															3			
Kates Creek	8040101	-041	8.2		U															3			
S.Fork Ouachita	8040101	-043	22.5	UWSFO01	M	S	S	S	S	S	S									1			
Mazarn Creek	8040101	-045	23.3	UWMZC01	M	S	S	S	S	S	S									1			
Little Mazarn	8040101	-047	14.8	UWSFM01	M	S	S	S	S	S	S									1			
Prairie Creek	8040101	-048	10.0	OUA0040	M	S	N	S	S	S	S	SE	UN	UN		SI	DO	Cu		4a	5	5	
TOTAL MILES	662.2																						
MILES UNASSESSED	66.2																						
MILES EVALUATED	233.8																						
MILES MONITORED	362.2																						

ME =Al, Be, Cd, Cu, Ni, Zn

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	596.0	0.0
FISHERIES	560.0	36.0
PRIMARY CONTACT	596.0	0.0
SECONDARY CONTAC	596.0	0.0
DRINKING SUPPLY	585.7	10.3
AGRI & INDUSTRY	585.7	10.3

Table A-19 (cont.): Planning Segment 2F—Designated Use Attainment Status and Water Quality Monitoring

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

Table A-20: Segment 2F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0000523	EVRAZ STRATCOR, INC.	TRIB,LK CATHERINE,OUACHITA RV	001	8040101	Garland	1
AR0000531	REYNOLDS METALS CO-GUM SPRINGS	OUACHITA RV	027	8040102	Clark	2
AR0000833	WEYERHAEUSER NR CO-MOUNTAIN PINE	GLAZYPEAU CR,OUACHITA RV	009	8040101	Garland	3
AR0000841	ARKANSAS ELECTRIC COOP-MCCLELL	OUACHITA RV	001	8040201	Ouachita	4
AR0000850	MOUNTAIN VALLEY SPRING COMPANY	TRIB,GLAZYPEAU CR,LK HAMILTON	009	8040101	Garland	5
AR0000868	HOT SPRING CO-JONES MILL WWTF	COVE CR,OUACHITA R	970	8040102	Hot Spring	6
AR0001147	ENTERGY ARKANSAS-LAKE CATHERINE	LK CATHERINE,OUACHITA R	001	8040101	Hot Spring	7
AR0020109	USDAFS-OUACHITA CIVILIAN CONSERVATION CENTER	OUACHITA RV	009	8040101	Garland	8
AR0020222	USA COE IRON MT-DEGRAY	DEGRAY LK,CADDO RV,OUACHITA RV	014	8040102	Clark	9
AR0020231	USA COE SHOUSE FORD-DEGRAY	DEGRAY LK,CADDO RV,OUACHITA RV	012	8040102	Hot Spring	10
AR0020605	ARKADELPHIA, CITY OF	OUACHITA RV	004	8040102	Clark	11
AR0021539	MOUNTAIN PINE, CITY OF	GLAZYPEAU CR,OUACHITA RV	009	8040101	Garland	12
AR0022365	CAMDEN, CITY OF	OUACHITA RV	005	8040102	Ouachita	13
AR0022781	USACE-SPILLWAY RECREATION AREA	LK OUACHITA,0UACHITA RV	009	8040101	Garland	14
AR0022799	USA-COE LITTLE FIR RECREATION	LK OUACHITA	009	8040101	Montgomery	15
AR0022802	USA-COE BRADY MTN REC AREA	LK OUACHITA	009	8040101	Garland	16
AR0033855	MOUNT IDA, CITY OF	S FK OUACHITA RV,OUACHITA RV	043	8040101	Montgomery	17
AR0033880	HOT SPRINGS, CITY OF	LK CATHERINE,OUACHITA RV BASIN	001	8040101	Garland	18
AR0034126	MALVERN, CITY OF	OUACHITA RV	007	8040102	Hot Spring	19
AR0035394	USA-COE DENBY POINT RECREATION	LK OUACHITA	043	8040101	Montgomery	20
AR0035408	USACE TOMPKINS BEND REC AREA	LK OUACHITA	043	8040101	Montgomery	21
AR0035416	USA-COE CRYSTAL SPRINGS REC AR	LK OUACHITA	009	8040101	Garland	22
AR0035424	USA-COE JOPLIN RECREATION AREA	LK OUACHITA	017	8040101	Montgomery	23
AR0035432	USA-COE CADDO DRIVE RECREATION	DEGRAY LK,CADDO RV,OUACHITA RV	012	8040102	Hot Spring	24
AR0035459	USA COE ALPINE RIDGE-DEGRAY	DEGRAY LK,CADDO RV,OUACHITA RV	013	8040102	Clark	25
AR0035645	GLENWOOD, CITY OF	CADDO RV	019	8040102	Pike	26
AR0035939	SPARKMAN, CITY OF	CYPRESS CR TRIB,OUACHITA R	801	8040102	Dallas	27
AR0036013	USA-COE ARLIE MOORE-DEGRAY	DEGRAY LK,CADDO RV,OUACHITA RV	012	8040102	Clark	28
AR0036021	USA-COE SPILLWAY-DEGRAY LAKE	TRIB,CADDO RV,OUACHITA RV	010	8040102	Clark	29
AR0036609	TREMONT CORPORATION; D/B/A DEM	BLACK VALLEY CR TRIB,S FK CADDO RV	023	8040102	Montgomery	30
AR0036692	MENA, CITY OF	TRIB,PRAIRIE CR,OUACHITA RV	048	8040101	Polk	31
AR0036749	ARKADELPHIA HUMAN DEV CTR	TRB, CADDO RV, OUACH RV	010	8040102	Clark	32
AR0036811	ARK PARKS LAKE OUACHITA	LK OUACHITA,OUACHITA RV	009	8040101	Garland	33
AR0037061	AR PARKS AND TOURISM-DEGRAY LAKE	DEGRAY LK	012	8040102	Hot Spring	34
AR0038121	ARK PARKS LAKE CATHERINE	LK CATHERINE,OUACHITA RV	001	8040101	Hot Spring	35
AR0038270	BAKER-HUGHES INTEQ	S FK CADDO RV,CADDO RV,OUACHITA RV	023	8040102	Montgomery	36
AR0039403	HEP OA, LLC	DIT,LK OUACHITA	043	8040101	Montgomery	37
AR0040801	SHANGRI-LA RESORT, INC	LK OUACHITA	043	8040101	Montgomery	38

Table A-20 (cont.): Segment 2F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0041050	CHURCH OF NAZARENE, SOUTH ARK DIST	MACRS CR	036	8040101	Polk	39
AR0041319	MILL POND VILLAGE	SORRELLS CR, FOURCHE A LOUPE CR,LK HAMILTON,OUCHIT	006	8040101	Garland	40
AR0042293	HARBOR SOUTH DEVELOPMENT	TRB,LK OUACHITA	043	8040101	Montgomery	41
AR0043125	NORMAN, CITY OF	CADDO RV,DEGRAY LK,OUACHITA RV	021	8040101	Montgomery	42
AR0043354	ACME BRICK COMPANY- PERLA FACILITY	UNNAMED TRIB, TOWN CR,OUACHITA RIVER	007	8040102	Hot Spring	43
AR0044172	WESTWOOD VILLAGE SEWER FACILITIES BOARD	LK HAMILTON	006	8040101	Garland	44
AR0044814	GS ROOFING PRODUCTS COMPANY, INC. - CERTAINTEED	TRIB,FIVE MI CR,CADDO RV,OUACHITA RV	019	8040102	Montgomery	45
AR0045128	JIMMY A. MCCLARD - D/B/A MCCLARD'S 270 W SHOPPING CENTER	UNNAMED TRIB,CEARLEY CR,LK HAMILTON,OUACHITA RV	006	8040101	Garland	46
AR0045411	CADDO VALLEY, CITY OF	CADDO RIVER,OUACHITA RIVER	010	8040102	Clark	47
AR0045624	LAKE HAMILTON SCHOOL DISTRICT NO. 5	UNNAMED TRIB,LOST CR,MAZARN CR,LK HAMILTON	047	8040101	Garland	48
AR0045829	O'BRIEN PROPERTIES, INC.	TRIB,GLAZYPEAU CR,OUACHITA RV	009	8040101	Garland	49
AR0046612	BRAZEALE LUMBER CO	TRIB,BRUSHY CR,OUACHITA RV	026	8040102	Dallas	50
AR0047139	RAY WHITE LUMBER CO	TRIB,CYPRUS CR,OUACHITA RV	030	8040102	Dallas	51
AR0047856	SHIELDS WOOD PRODUCTS, INC	TRIB,OUACHITA RV	004	8040102	Clark	52
AR0048020	DONALDSON, CITY OF	OUACHITA RV	006	8040102	Hot Spring	53
AR0048046	ROGERS LUMBER COMPANY, INC	TRIB, LOWER OLD RV,OUACHITA RV	001	8040201	Ouachita	54
AR0048241	LAKE CENTER GROCERY AND DELI	UNMAMED TRIB, BIG HILL CR,LK DEGRAY,CADDO RV	012	8040102	Hot Spring	55
AR0048275	CAMP OZARK, OZARK INTERESTS, INC.	TRIB,OUACHITA RV	031	8040101	Montgomery	56
AR0048615	DIAMONDHEAD RESORT COMMUNITY	TRIB,LK CATHERINE,OUACHITA RV	001	8040101	Garland	57
AR0048755	ENTERGY ARKANSAS, INC. - CARPENTER DAM	OUACHITA RV @LK OUACHITA DOWNSTREAM/CARPENTER DAM	001	8040101	Garland	58
AR0048763	ENTERGY ARKANSAS-REMMEL DAM	OUACHITA RV	007	8040101	Hot Spring	59
AR0048950	UMETCO MINERALS CORP-WILSON MI	WILSON CR, LK CATHERINE, OUACHITA RV	001	8040101	Garland	60
AR0049026	GARLAND GASTON LUMBER COMPANY	BRUSHY CR,OUACHITA R	026	8040102	Dallas	61
AR0049115	CNL INCOME MAGIC SPRING, LLC - D/B/A MAGIC SPRINGS & CRYSTAL FALLS	TRIB,MIDDLE BR/GULPHA CR,LK CATHERINE,OUACHITA R	001	8040101	Garland	62
AR0049263	BEAN LUMBER COMPANY	TRIB,CADDO RV,OUACHITA RV	019	8040102	Pike	63
AR0049417	KGEN HOT SPRING,LLC	OUACHITA RV	007	8040102	Hot Spring	64
AR0049611	HOT SPRING POWER CO.,LLC	OUACHITA RV	007	8040102	Hot Spring	65
AR0049794	HALLIBURTON ENERGY SERVICES	CHAMBERLAIN CR,COVE CR,OUACHITA RV	501	8040102	Hot Spring	66
AR0049891	ANTHONY TIMBERLANDS, INC.	TRIB,OUACHITA RV	001	8040102	Ouachita	67
AR0050105	HARMONY GROVE PUBLIC SCHOOL	TRIB,MIZZELL CR,PALMER BU,OUCHITA R	054	8040102	Ouachita	68
AR0050148	HOT SPRINGS, CITY OF-SOUTHWEST	LTL MAZARN CR,LK HAMILTON	047	8040101	Garland	69
AR0050458	MARY DARGUZAS D/B/A EL ACAPULCO RESTAURANT	UNNAMED TRIB,GLAZYPEAU CR,OUACHITA RV	009	8040101	Garland	70
AR0050512	REYNOLDS FOIL INC.	STONEY CR,LK CATHERINE,OUACHITA RV	001	8040102	Hot Spring	71
AR0050644	LAKESIDE GARDENS CONDOMINIUMS	LK HAMILTON,OUACHITA RV	004	8040101	Garland	72
AR0050733	WAL-MART SUPERCENTER #5433-00	TRIB,GLAZYPEAU CR,LK HAMILTON,...	003	8040101	Garland	73
AR0050806	CAMP YORKTOWN BAY - AR CONFERE	LK OUACHITA	011	8040101	Garland	74
AR0050962	CHARLIE'S PIZZA PUB	TRB, LITTLE BLAKELY CR,LK OUACHITA, OUACHITA RV	019	8040101	Garland	75
AR0051098	BISMARCK SCHOOL DISTRICT	TRIB,BIG HILL CR,LK DEGRAY,CADDO R,OUACHITA R	012	8040102	Hot Spring	76
AR0051829	DR. JILL SUMMERFORD - WAGGIN' WHEEL VET CLINIC	UNNAMED TRIB LITTLE GLAZYPEAU CR,LAKE HAMILTON	009	8040102	Garland	77

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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

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. Approximately 17 percent of the waters within this segment are designated as Extraordinary Resource Waters.

Portions of the Little Missouri River have been listed as not attaining the fisheries designated use because of excessive copper contamination. Additional investigation into this issue is needed to determine if in fact aquatic life communities are being affected and if the reported metal concentrations are accurate.

Figure A-16: Planning Segment 2G

(Segment 2G)

Table A-21: Planning Segment 2G—Designated Use Attainment Status and Water Quality Monitoring

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4
SEG-2G																							
L. Missouri R.	8040103	-001	1.8		U															3			
L. Missouri R.	8040103	-005	10.4		U															3			
L. Missouri R.	8040103	-006	4.6		U															3			
L. Missouri R.	8040103	-007	7.0		U															3			
L. Missouri R.	8040103	-008	19.6	OUA0035	M	S	S	S	S	S	S	SE				Tb				5			
Terre Noire Cr.	8040103	-002	27.4	UWTNR01	M	S	S	S	S	S	S	UN				pH				5			
Terre Noire Cr.	8040103	-003	19.6	UWTNR02	M	S	S	S	S	S	S	UN				pH				5			
Gentry Creek	8040103	-004	15.4		E	S	S	S	S	S	S									1			
Antoine River	8040103	-009	5.4		E	S	S	S	S	S	S									1			
Antoine River	8040103	-010	31.6	UWATR01	M	S	S	S	S	S	S									1			
Wolf Creek	8040103	-011	18.0		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-012	10.8		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-013	5.0		E	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-015	10.5	OUA0039B	M	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-017	5.5		U	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-018	8.9		U	S	S	S	S	S	S									1			
L. Missouri R.	8040103	-022	17.6	OUA0022	M	S	S	S	S	S	S	UN				Cu				5			
L. Missouri R.	8040103	-023	13.6		U	S	S	S	S	S	S									1			
Saline Creek	8040103	-014	13.1		U	S	S	S	S	S	S									1			
Prairie Creek	8040103	-016	11.2		U	S	S	S	S	S	S									1			
Long Creek	8040103	-024	6.8		U	S	S	S	S	S	S									1			
Muddy Fork	8040103	-025	24.4	UWMFC01	M	S	S	S	S	S	S									1			
Ozan Creek	8040103	-026	8.6	UWOZC01	M	S	S	S	S	S	S									1			
Ozan Creek	8040103	-027	2.0		E	S	S	S	S	S	S									1			
N. Fork Ozan	8040103	-028	16.4		E	S	S	S	S	S	S									1			
M. Fork Ozan	8040103	-029	10.9		E	S	S	S	S	S	S									1			
S. Fork Ozan	8040103	-030	13.0		E	S	S	S	S	S	S									1			
Terre Rouge	8040103	-031	14.5	UWTRC01	M	S	S	S	S	S	S	SE				Tb				5			
Caruse Creek	8040103	-032	15.2		E	S	S	S	S	S	S									1			
Terre Rouge	8040103	-033	20.7		M	S	S	S	S	S	S									1			
Caney Creek	8040103	-034	13.6	UWCYC01	M	S	S	S	S	S	S									1			
Caney Creek	8040103	-035	10.6		E	S	S	S	S	S	S									1			
Cypress Creek	8040103	-036	7.9		E	S	S	S	S	S	S									1			
White Oak Creek	8040103	-037	5.9		E	S	S	S	S	S	S									1			
TOTAL MILES	427.5																						
MILES UNASSESSED	82.9																						
MILES EVALUATED	136.5																						
MILES MONITORED	208.1																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	403.7	0
FISHERIES	403.7	0
PRIMARY CONTACT	403.7	0
SECONDARY CONTACT	403.7	0
DRINKING SUPPLY	403.7	0
AGRI & INDUSTRY	403.7	0

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

Table A-22: Segment 2G Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0000612	FIRESTONE BLDG PRODUCTS	GARLAND CR TRIB & PINE CR TRIB	031	8040103	Nevada	1
AR0000906	POTLATCH LAND AND LUMBER LLC, PRESCOTT LUMBER	MILL BR,ONION CR,TERRE ROUGE CR	031	8040103	Nevada	2
AR0020729	CERTAIN TEED GYPSUM MFG.	BLUFF CR,MUDDY FORK CR-LTL MO RV	025	8040103	Howard	3
AR0022551	GURDON, CITY OF	CANEY CR,TERRE NOIR CR,LTL MO RV,OUACHITA RV	002	8040103	Clark	4
AR0022772	USA COE SELF CREEK-LAKE GREESON	LK GREESON,LITTLE MISSOURI,OUACHITA RV	020	8040103	Pike	5
AR0033481	PRESCOTT, CITY OF	SEWER CR,TERRE ROUGE CR, LTL MO RV	031	8040103	Nevada	6
AR0036048	USA-COE COWHIDE COVE REC AREA	LK GREESON,LTL MISSOURI RV,OUACHITA RV	018	8040103	Pike	7
AR0037796	GEORGIA-PACIFIC WOOD PRODUCTS S LLC-GURDON CMPLEX	TRIB,CANEY CR,TERRE NOIRE CR,LTL MO. R,OUACHITA RV	010	8040103	Clark	8
AR0038113	AR PARKS & TOURISM-DAISY STATE	LK GREESON,LITL MO RV,OUACHITA RV	021	8040103	Pike	9
AR0038458	HOPE, CITY OF-PATE CREEK WWTP	PATE CR,TERRE ROUGE CR,LTL MO RV	033	8040103	Hempstead	10
AR0041432	DELIGHT, CITY OF	TRIB,WOLF CR,ANTOINE R,LTL MISSOURI R,OUACHITA R	011	8040103	Pike	11
AR0041688	BLEVINS, CITY OF	TRIB,OZAN CR,LTL MISS.RV,OUAC.RV	026	8040103	Hempstead	12
AR0041815	EMMET, CITY OF	TERRE ROUGE CR,LTL MO RIVER,OUACHITA RIVER	033	8040103	Nevada	13
AR0042439	NEVADA SCHOOL DISTRICT #1	TRIB,LTL CANEY CR,CANEY CR,LTL MO RV	034	8040103	Nevada	14
AR0043281	MURFREESBORO, CITY OF	LTL MISSOURI RV,OUACHITA RV	015	8040103	Pike	15
AR0044270	AR HWY DEPT-GURDON REST AREA	TRIB,BOGGY CR,BEAVER SLU,LTL MISSOURI R,OUACHITA RV	008	8040103	Clark	16
AR0045551	INTERSTATE PROPERTY OWNERS	S BOAT DIT,TERRE NOIR CR	010	8040103	Clark	17
AR0047180	PERRYTOWN, CITY OF	PATE CR,TERRE ROUCH CR,LTL MO RV,OUACHITA RV	033	8040103	Hempstead	18
AR0047546	ANTHONY TIMBERLANDS, INC-BEIRNE FACILITY	TRIB,LTL MCNEELEY CR, MCNEELEY CR,LTL MISSOURI RV	007	8040103	Clark	19
AR0048551	OKOLONA, CITY OF-WASTEWATER TR	TRIB,LTL MISSOURI RV,OUACHITA RV	008	8040103	Clark	20
AR0051101	AMITY, CITY OF	LTL ANTOINE CR,ANTOINE R,LTL MISSOURI R,OUACHITA R	010	8040103	Clark	21
AR0051161	USACOE KIRBY LANDING RECREATION AREA	LK GREESON, LTL MO R, OUACHITA RV	020	8040103	Pike	22
AR0051187	HORIZON FOOD MART	GARLAND CR, LIT MISSOURI R, OUACHITA RV	008	8040103	Nevada	23
AR0051241	AR PARKS WHITE OAK LAKE STATE PARK	WHITE OAK LAKE	038	8040103	Nevada	24

ARKANSAS RIVER BASIN

SEGMENT 3A LOWER ARKANSAS RIVER

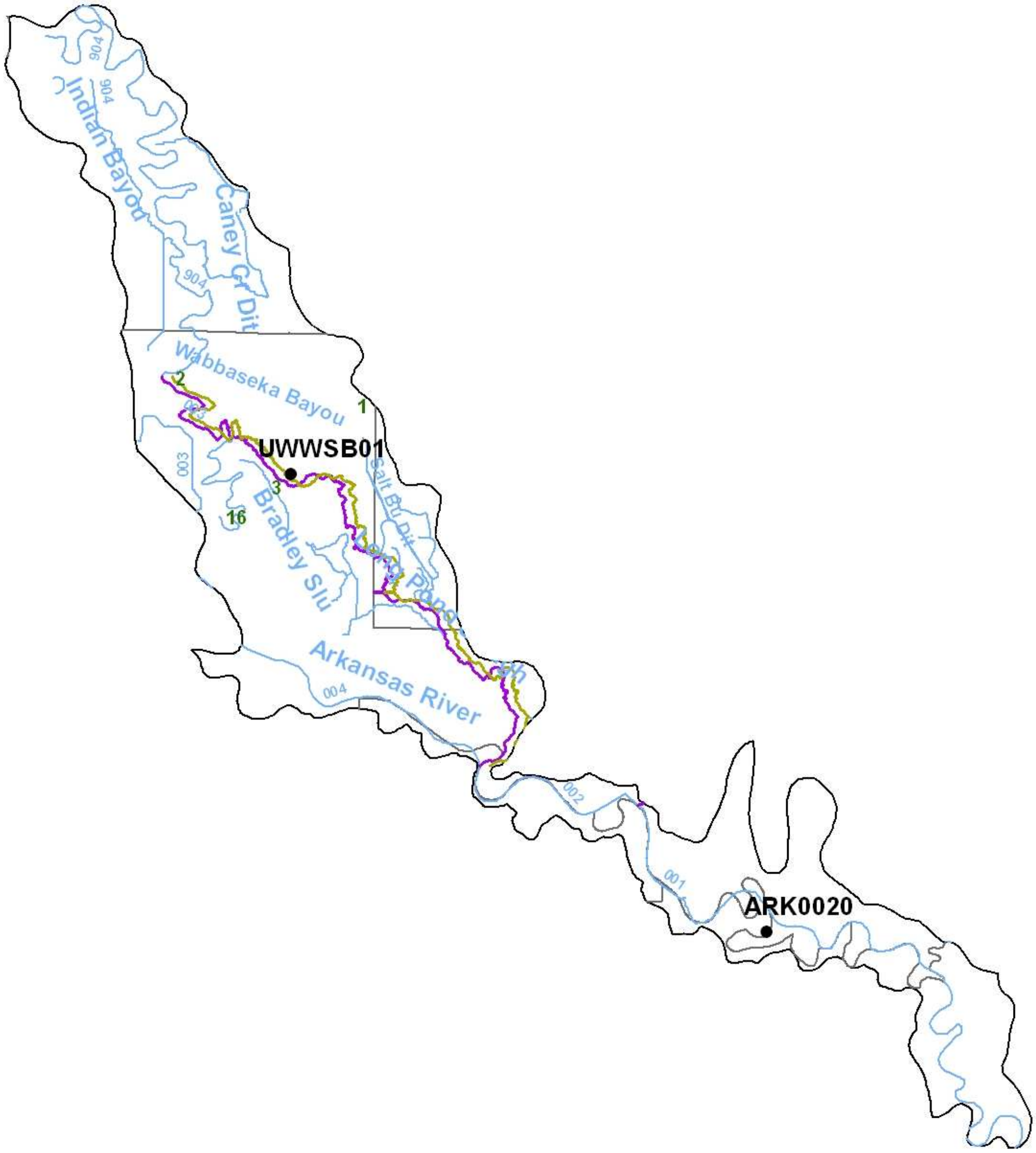
Segment 3A, located in the southeastern part of Arkansas includes small portions of Desha, Lincoln, Jefferson, Arkansas, and Lonoke Counties. These waters make up the last 52-mile segment of the main stem of the Arkansas River and Wabbaseka Bayou.

Summary of Water Quality Conditions

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 lower 30-mile portion of the Arkansas River is designated as Extraordinary Resource Waterbody. This stream segment is below the Arkansas Post Lock and Dam which diverts barge traffic to the White River and has had little to no channel maintenance and remains free flowing.

The fisheries designated use is listed as impaired in Wabbaseka Bayou because the Bayou is unable to maintain the dissolved oxygen standard for Channel Altered Delta streams. However, there are no aquatic community data to support this listing. In addition, low dissolved oxygen concentrations are a naturally occurring condition throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated. There is also no discernible man-induced cause for the low dissolved oxygen concentrations during the critical season.

Figure A-17: Planning Segment 3A



(Segment 3A)

Table A-23: Planning Segment 3A—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-3A																										
Arkansas River	8020401	-001	52.2	ARK0020	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				FISHERIES	65.5	121.1
Wabbaseka B.	8020401	-003	101.7	UWWSB01	M	S	N	S	S	S	S	UN				DO				5				PRIMARY CONTACT	186.6	0
Arkansas River	8020401	-004	19.4		E	S	N	S	S	S	S									1				SECONDARY CONTACT	186.6	0
TOTAL MILES	186.6																							DRINKING SUPPLY	186.6	0
MILES UNASSESSED	0.0																							AGRI & INDUSTRY	186.6	0
MILES EVALUATED	32.7																									
MILES MONITORED	153.9																									

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

Table A-24: Segment 3A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0022284	HUMPHREY, CITY OF	UNNAMED DIT,LATERAL #5 DIT,BEAR BU,SALT BU,CYPRESS LK, LTL BU METO,AR RV	005	8020401	Jefferson	1
AR0035980	AR DEPT OF CORRECTION-TUCKER INTERMEDIATE REF	WABBSEKA BU,GRAND CYPRESS LK, BAYOU METO,ARKANSAS	003	8020401	Jefferson	2
AR0039896	WABBASEKA, CITY OF	TRIB,BRADLEY SLU,ARKANSAS RV	003	8020401	Jefferson	3

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 make up the major surface water resource in the segment. Major tributaries include Bayou Two Prairie, Mill Bayou, and Kings Bayou.

Summary of Water Quality Conditions

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

Many segments of Bayou Meto and a segment of Bayou Two Prairie are listed because of low dissolved oxygen concentrations. This is a naturally occurring condition throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated. This issue will need to be addressed either through a standards change or an assessment methodology change.

Water quality assessments on the upper portion of Bayou Meto indicate excessive levels of copper and lead. The source of the metals is thought to be from point source discharges located in the watershed.

Figure A-18: Planning Segment 3B

Table A-25: Planning Segment 3B—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-3B																										
Bayou Meto	8020402	-001	4.3		E	S	N	S	S	S	S	UN				DO				5				FISH CONSUMPTION	187.4	0
Bayou Meto	8020402	-003	39.8	ARK0023	M	S	N	S	S	S	S	UN				DO				5				FISHERIES	98.5	88.9
Bayou Meto	8020402	-005	41.5	UWBMO02+	M	S	S	S	S	S	S									1				PRIMARY CONTACT	187.4	0
Bayou Meto	8020402	-907	12.3	ARK0060	M	S	S	S	S	S	S	UN	UN			DO				5	5			SECONDARY CONTACT	187.4	0
Bayou Meto	8020402	-007	44.8	ARK0050	M	S	N	S	S	S	S	UN		IP		DO	Cu	PO		5	3	5		DRINKING SUPPLY	187.4	0
Mill Bayou	8020402	-002	31.0		U															3				AGRI & INDUSTRY	187.4	0
Kings Bayou	8020402	-004	15.3		U															3						
B.Two Prairie	8020402	-006	44.7	ARK0097	M	S	S	S	S	S	S									1						
TOTAL MILES	233.7																									
MILES UNASSESSED	46.3																									
MILES EVALUATED	4.3																									
MILES MONITORED	183.1																									

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

Table A-26: Segment 3B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0001163	REMINGTON ARMS COMPANY, INC	BU METO,ARKANSAS RV	007	8020402	Lonoke	1
AR0021661	CABOT WATER WASTEWATER COMM.	TRIB, BU TWO PRAIRIE,BU METO	006	8020402	Lonoke	2
AR0022390	GILLETT, CITY OF	BILL'S BU,FLAG LK,BU METO,AR RV	001	8020402	Arkansas	3
AR0033642	GRAVEL RIDGE SID #213	DIT,KELLOGG CR,BU METO	007	8020402	Pulaski	4
AR0033740	CARLISLE, CITY OF	BU TWO PRAIRIE,BU METO,ARKANSAS RV	006	8020402	Lonoke	5
AR0034380	STUTTGART, CITY OF	DIT,KING BU,BU METO,ARKANSAS RV	004	8020402	Arkansas	6
AR0034746	LONOKE, CITY OF	BU TWO PRAIRIE,BU METO,AR RV	006	8020402	Lonoke	7
AR0037176	SHERWOOD, CITY OF-NORTH	TRIB,KELLOGG CR,BU METO,ARKANSAS RV	007	8020402	Pulaski	8
AR0038075	RUNYAN SID #211	DIT,KELLOGG CR,BU METO,ARKANSAS RV	007	8020402	Pulaski	9
AR0041149	ARK MILITARY CAMP ROBINSON	5-MILE CR,TRAMMEL LK,BRUSHY ISLAND	011	8020402	Pulaski	10
AR0041335	JACKSONVILLE SEWER COMMISSION	BU METO,ARKANSAS RV	007	8020402	Pulaski	11
AR0043761	ALMYRA, CITY OF	MILL BAYOU,BIG BU METO,AR RV	002	8020402	Arkansas	12
AR0044598	PCSSD-BAYOU METO ELEMEMENTARY SCHOOL TREAT FAC	DITCH, BU METO, ARKANSAS RV	007	8020402	Pulaski	13
AR0045608	SHERWOOD, CITY OF-SOUTH FACILITY	WOODRUFF CR,FIVE MILE CR,BU METO CR, AR RV		8020402	Pulaski	14
AR0046311	ROGERS GROUP INC.-CABOT QUARRY	WHITE OAK BR,2 PRAIRIE BU,BU METO, ARKANSAS RV	006	8020402	Lonoke	15
AR0048313	H.A.C.T. WW TREATMENT DIST	CROOKED CR,BU METO,AR RV	005	8020402	Lonoke	16
AR0049875	PHIL ROD ACRES MOBILE HOME PK	DIT, BLUE BR, BU TWO PRAIRIE, BU METO, AR RV	006	8020402	Pulaski	17
AR0050687	HILLSIDE BAYOU, LLC	BAYOU METO,ARKANSAS RV	007	8020402	Pulaski	18
AR0050822	HARRELL PROPERTY SEWER SYSTEM	TRIB,BU METO,ARKANSAS RV	907	8020402	Pulaski	19
AR0051799	WESTBROOK DEVELOPMENT, LLC - DOLLAR GENERAL	TRIB,BAYOU METO,ARKANSAS RV	007	8020402	Lonoke	20

SEGMENT 3C — ARKANSAS RIVER AND TRIBUTARIES: EMMETT LOCK AND DAM SANDERS (#4) AND MURRAY LOCK AND DAM (#7)

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

Summary of Water Quality Conditions

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. Four monitoring stations are located on the main stem of the Arkansas River which provides monitored data for 52.2 miles of the river. Data from USGS studies on the Maumelle River were used to assess this stream. Quarterly monitoring was conducted at one station on Plum Bayou.

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

Figure A-19: Planning Segment 3C

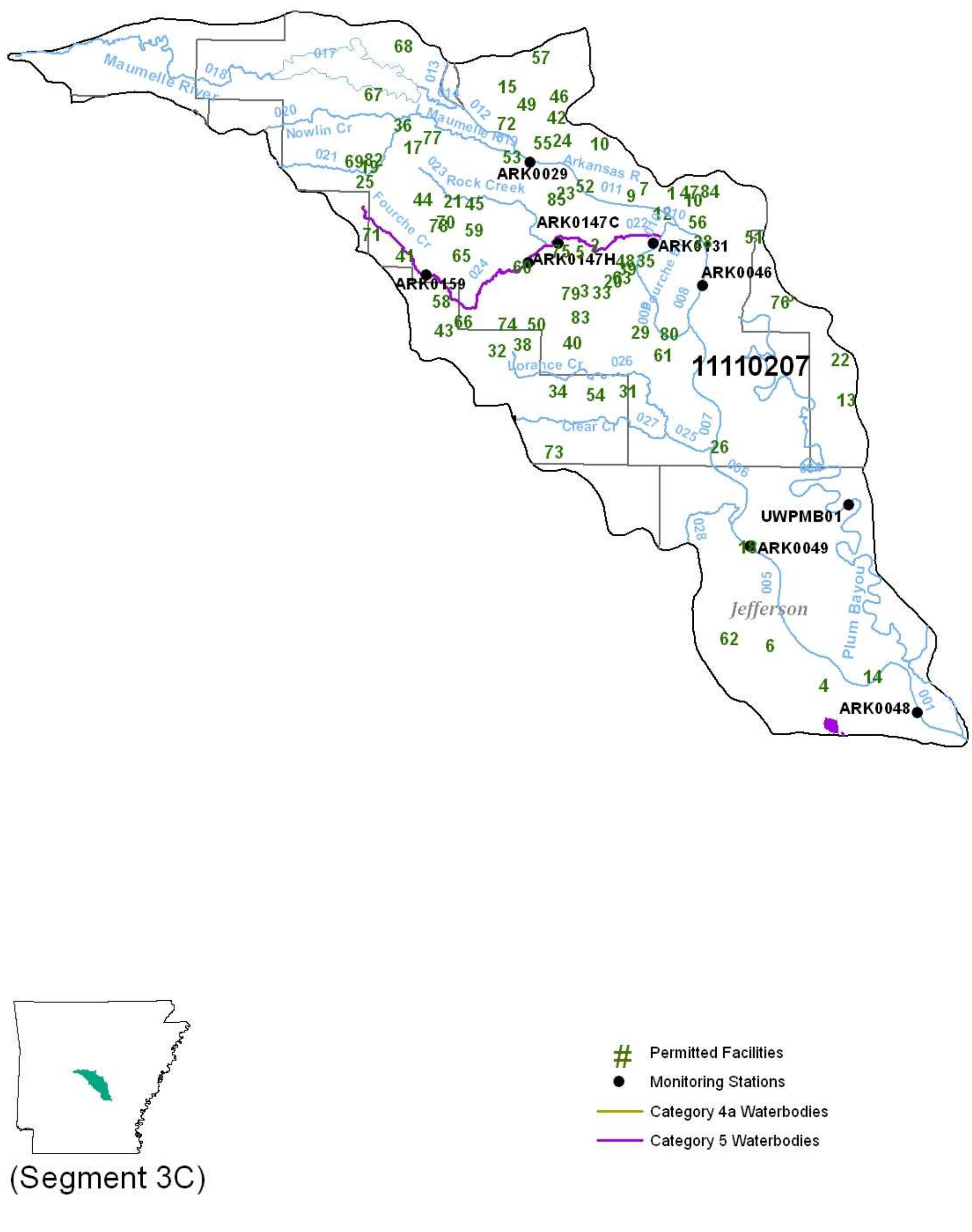


Figure A-20: Planning Segment 3C Inset

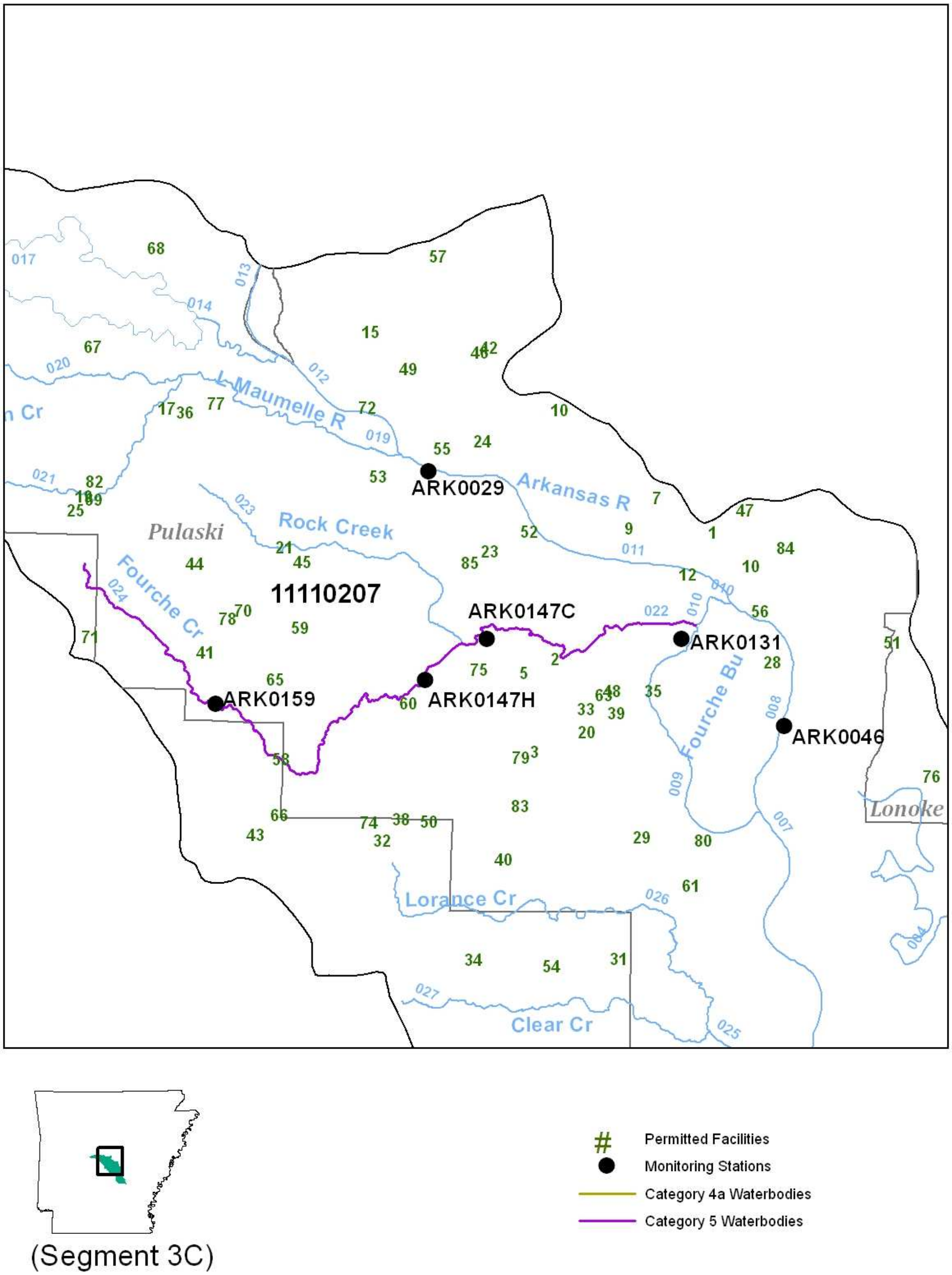


Table A-27: Planning Segment 3C—Designated Use Attainment Status and Water Quality Monitoring Stations

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-3C																										
Arkansas River	11110207	-001	6.7	ARK0048	M	S	S	S	S	S	S									1				FISH CONSUMPTION	225.1	0
Plum Bayou	11110207	-002	0.3		M	S	S	S	S	S	S									1				FISHERIES	215.9	9.2
Indian Bayou	11110207	-003	3.2		U															3				PRIMARY CONTACT	225.1	0
Plum Bayou	11110207	-004	68.4	UWPMB01	M	S	S	S	S	S	S									1				SECONDARY CONTACT	225.1	0
Arkansas River	11110207	-005	28.0	ARK0049	M	S	S	S	S	S	S									1				DRINKING SUPPLY	225.1	0
Arkansas River	11110207	-006	6.2		E	S	S	S	S	S	S									1				AGRI & INDUSTRY	225.1	0
Arkansas River	11110207	-007	9.2		E	S	S	S	S	S	S									1						
Arkansas River	11110207	-008	9.8	ARK0046	M	S	S	S	S	S	S									1						
Fourche Bayou	11110207	-009	11.0		U															3						
Fourche Bayou	11110207	-010	1.6		U															3						
Arkansas River	11110207	-011	7.7	ARK0029	M	S	S	S	S	S	S									1						
Arkansas River	11110207	-012	5.1		M	S	S	S	S	S	S									1						
Arkansas River	11110207	-013	5.7		E	S	S	S	S	S	S									1						
Maumelle River	11110207	-014	3.3		E	S	S	S	S	S	S									1						
Maumelle River	11110207	-018	24.2	USGS	M	S	S	S	S	S	S									1						
Little Maumelle	11110207	-019	9.5	ARK0140	M	S	S	S	S	S	S									1						
Little Maumelle	11110207	-021	10.1		E	S	S	S	S	S	S									1						
Nowlin Creek	11110207	-020	10.5		E	S	S	S	S	S	S									1						
Fourche Creek	11110207	-022	9.2	ARK0131+	M	S	N	S	S	S	S	SE	UN			Tb	Cu			5	5					
Rock Creek	11110207	-023	13.0		U															3						
Fourche Creek	11110207	-024	11.2	ARK0130+	M	S	S	S	S	S	S	SE				Tb				5						
Clear Creek	11110207	-025	3.2		U															3						
Lorance Creek	11110207	-026	15.2		U															3						
Clear Creek	11110207	-027	11.9		U															3						
Tar Camp Creek	11110207	-028	7.6		U															3						
TOTAL MILES	291.8																									
MILES UNASSESSED	66.7																									
MILES EVALUATED	45.0																									
MILES MONITORED	180.1																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0048	Arkansas River below Pine Bluff, Lock and Dam No. 4	Y	1	A
UWPMB01	Plum Bayou 1 mile west of Highway 15 near Tucker		2	R
ARK0049	Arkansas River above Pine Bluff, Lock and Dam No. 5	Y	1	A
ARK0046	Arkansas River at Lock and Dam No. 6	Y	1	A
ARK0029	Arkansas River at Murray Lock and Dam		1	A
ARK0140	Little Maumelle River near Little Rock		2	R
ARK0147H	Fourche Creek		1	S
ARK0147G	Fourche Creek at Highway 5 Bridge		1	S
ARK0147F	Fourche Creek at Otter Creek Road		1	S
ARK0147E	Fourche Creek below I-430		1	S
ARK0130	Fourche Creek at I-430 bridge in Little Rock		1	R
ARK0147D	Fourche Creek below Rock Creek Confluence		1	S
ARK0147C	Fourche Creek at Benny Craig Park		1	S
ARK0147B	Fourche Creek at Arch-Pike Street Bridge		1	S
ARK0147A	Fourche Creek at Confererate Boulevard		1	S
ARK0131	Fourche Creek at Fourche Dam Pike road off I-440 in Little Rock		1	R

Table A-28: Segment 3C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0001376	ENTERGY-CECIL LYNCH STEAM ELEC	ARKANSAS RV	011	11110207	Pulaski	1
AR0001414	MINNESOTA MINING & MFG-ARCH ST	TRIB,FOURCHE CR,ARKANSAS RV	022	11110207	Pulaski	2
AR0001503	MCGEORGE CONTRACTING CO, INC -	LTL FOURCHE CR , FOURCHE CR, AR RV	022	11110207	Pulaski	3
AR0001601	DELTA NATURAL KRAFT, LLC	ARKANSAS RIVER	005	11110207	Jefferson	4
AR0001635	SMITH FIBERCAST	DITCH,TRIB,FOURCHE CR,AR RV	022	11110207	Pulaski	5
AR0001678	USA-PINE BLUFF ARSENAL	TRIB/PHILLIPS CR & ARKANSAS RV	005	11110207	Jefferson	6
AR0001775	UNION PACIFIC RAILROAD COMPANY	E & W BR/DARK HOLLOW CANAL,ARKANSAS	011	11110207	Pulaski	7
AR0001970	EVERGREEN PACKAGING, INC. - PINE BLUFF MILL	AR RV-3C (1); TRIB COUSART BU,BU BARTHOLOMEW 2B (2)	005	11110207	Jefferson	8
AR0002542	ALLEN GRANITE INDUSTRIES, INC	TRIB,INK BU,ARKANSAS RV	011	11110207	Pulaski	9
AR0020303	N LITTLE ROCK WW UTILITY-FAULKNER LAKE	ARKANSAS RV	008	11110207	Pulaski	10
AR0020320	N. LITTLE ROCK WW UTILITY-FIVE MILE CREEK	ARKANSAS RV	011	11110207	Pulaski	11
AR0021806	LITTLE ROCK WW UTILITY-ADAMS FIELD WWTP	ARKANSAS R	011	11110207	Pulaski	12
AR0022128	ENGLAND, CITY OF	WABBASEKA BU,PLUM BU,ARKANSAS RV	004	11110207	Lonoke	13
AR0033316	PINE BLUFF WW UTILITY BOYD PT	ARKANSAS RV	005	11110207	Jefferson	14
AR0033626	MAUMELLE IMPROVEMENT DISTRICT 500	ARKANSAS RV	012	11110207	Pulaski	15
AR0034771	ALTHEIMER, CITY OF	ARKANSAS RV	001	11110207	Jefferson	16
AR0035963	PCSSD-ROBINSON ELEMENTARY SCHOOL TREAT FAC	TRIB,LTL MAUMELLE RIVER,ARKANSAS RIVER	021	11110207	Pulaski	17
AR0036331	ENTERGY ARKANSAS-WHITE BLUFF	ARKANSAS R	005	11110207	Jefferson	18
AR0036421	FERNCLIFF CAMP & CONFERENCE CE	FERNDALE CR,LTL MAUMELLE RV,ARKANSAS RV	021	11110207	Pulaski	19
AR0036447	GEO SPECIALTY CHEMICALS-WINROC	FISH CR, BIG LK, PENNINGTON BU, ARKANSAS RV	007	11110207	Pulaski	20
AR0037338	JACQUELYN NWANODI - BAKER APARTMENTS	PANTHER BR,BRODIE CR,FOURCHE CR,ARKANSAS RIVER	024	11110207	Pulaski	21
AR0037613	KEO, CITY OF	TRIB,NORTH BU,PLUM BU,ARKANSAS RV	004	11110207	Lonoke	22
AR0037745	LITTLE ROCK, CITY OF-LITTLE ROCK ZOOLOGICAL GARDENS	COLEMAN CR,FOURCHE CR,AR RV	022	11110207	Pulaski	23
AR0038288	N. LITTLE ROCK WW UTILITY-WHITE OAK BAYOU	ARKANSAS R	011	11110207	Pulaski	24
AR0039250	AR 4-H FOUNDATION, INC. D/B/A 4-H EDUCATION CENTER	FERNDALE CR,LTL MAUMELLE RIVER,AR RIVER	021	11110207	Pulaski	25
AR0039357	REDFIELD, CITY OF	ARKANSAS RV	006	11110207	Pulaski	26
AR0039543	MCALMONT CHURCH OF CHRIST-NLR	STARK BEND,FAULKNER LK		11110207	Pulaski	27
AR0040177	LITTLE ROCK WW UTILITY-FOURCHE CREEK WWTP	ARKANSAS RV	008	11110207	Pulaski	28
AR0040266	145TH ST WATER & SEWER IMPROVEMENT DIST NO. 345 OF PULASKI CO	CANE CR,FISH CR,LARANCE CR,PENNINGTON BU, AR RV	026	11110207	Pulaski	29
AR0040380	AR PARKS AND TOURISM-TOLTEC MOUNDS	DIT,NORTH BU,PLUM BU,ARKANSAS RV	004	11110207	Lonoke	30
AR0040860	MAPLE CREEK PROPERTY OWNERS SID NO. 2	TRIB,MAPLE CR,LORANCE CR, PENNINGTON BU, ARKANSAS R	026	11110207	Saline	31
AR0041424	PLEASANT OAKS SID, NO. 31	TRIB,OTTER CR,FOURCHE CR	024	11110207	Saline	32

Table A-28 (cont.): Segment 3C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0042544	CRILANCO OIL INC	TRIB,FISH CR,BIG LK,PENNINGTON BU		11110207	Pulaski	33
AR0042862	SHERIDAN SCHOOL DISTRICT N0 37 -EAST END	TRIB,MCCRIGHT BR,LORRANCE CR,BIG LK,PENNINGTON BU,	026	11110207	Saline	34
AR0042927	PCSSD-AUXILIARY SERVICE FAC	FOURCHE BU,ARKANSAS RV	009	11110207	Pulaski	35
AR0043893	PCSSD-ROBINSON HIGH SCHOOL	UNNAMED TRIB,LTL MAUMELLE RV,ARKANSAS RV	019	11110207	Pulaski	36
AR0043931	DIXON MANOR MHP, LLC	TRIB,FISH CR,ARKANSAS RV	007	11110207	Pulaski	37
AR0044393	HEINKE ROAD PROPERTY OWNERS SID NO. 34	UNNAMED TRIB,LTL FOURCHE CR,FOURCHE CR,ARKANSAS RV	022	11110207	Saline	38
AR0044601	PCSSD-FULLER SCHOOL TREATMENT	TRIB,FISH CR,FISH CR,LORANCE CR,PENNINGTON BAYOU,	026	11110207	Pulaski	39
AR0044610	PCSSD-LANDMARK ELEMENTARY SCHO	TRIB,TREADWAY BR,LORANCE CR	026	11110207	Pulaski	40
AR0044628	PCSSD-LAWSON ELEMENTARY SCHOOL	DIT,TRIB,FOURCHE CR,ARKANSAS RV	024	11110207	Pulaski	41
AR0044750	PCSSD - OAK GROVE HIGH SCHOOL TREATMENT FACILITY	UNNAMED TRIB,NEWTON CR,WHITE OAK BU, ARKANSAS RV	011	11110207	Pulaski	42
AR0044881	SALINE COUNTY WATERWORKS AND	CROOKED CR,FOURCHE CR,ARKANSAS RV	024	11110207	Saline	43
AR0045471	YOUTH HOME, INC.	MCHENRY CR,FOURCHE CR,ARKANSAS RV	024	11110207	Pulaski	44
AR0045560	OASIS RENEWAL CENTER	BRODIE CR, FOURCHE CR, ARKANSAS RV	023	11110207	Pulaski	45
AR0046086	C.P. GROUP	TRIB,NEWTON CR,WHITE OAK BU,AR RV	011	11110207	Pulaski	46
AR0046299	MAVERICK TRANSPORTATION	DIT,STARK BEND TRIB,FAULKNER LK		11110207	Pulaski	47
AR0046710	GRANITE MOUNTAIN QUARRIES	TRIB,FOURCHE CR,ARKANSAS RV	009	11110207	Pulaski	48
AR0046868	E.C. ROWLETT CONSTRUCTION, CO,	WHITE OAK BU,AR RV	012	11110207	Pulaski	49
AR0047261	CHICOT SEWER SYSTEM, LLC	TRIB,LTL FOURCHE CR,FOURCHE CR, ARKANSAS R	024	11110207	Saline	50
AR0047449	PCSSD-SCOTT SCHOOL TREATMENT SYSTEM	ASHLEY BU,HORSESHOE LK,SCOTT BU		11110207	Pulaski	51
AR0047929	CENTRAL ARKANSAS WATER-OZARK P	DIT,ARKANSAS RV	011	11110207	Pulaski	52
AR0047937	CENTRAL ARKANSAS WATER-JACK H.	TRIB,ROCK CR,FOURCHE CR, AR RV	023	11110207	Pulaski	53
AR0048399	MAPLE CREEK FARMS TRACT C H	TRIB,MAPLE CR,PENNINGTON BU	027	11110207	Saline	54
AR0048542	NLR ELECTRIC COMPANY	ARKANSAS RV	011	11110207	Pulaski	55
AR0048895	LITTLE ROCK HARBOR SERVICE, INC.	ARKANSAS RV	008	11110207	Pulaski	56
AR0048968	CEDAR HEIGHTS BAPTIST CHURCH	TRIB,WHITE OAK BU, AR RV	011	11110207	Pulaski	57
AR0049042	OWEN CREEK, LLC	OWEN CR,FOURCHE CR,ARKANSAS RV	024	11110207	Saline	58
AR0049051	HUMANE SOCIETY OF PULASKI COUNTY	UNNAMED TRIB,MCHENRY CR,FOURCHE CR,ARKANSAS RIVER	024	11110207	Pulaski	59
AR0049131	PARKER SOLVENTS COMPANY	WESSON SPRING,FOURCHE CR,ARKANSAS R	024	11110207	Pulaski	60
AR0049255	AECC-HARRY L. OSWALD GENERATING STA	ARKANSAS RV	007	11110207	Pulaski	61
AR0049581	THE FAMILY CHURCH	TRIB,ARNOLD CR,CANEY BU,LK LANGHOFE	005	11110207	Jefferson	62
AR0050075	ERGON ASPHALT AND EMULSIONS, INC.	TRIB,FISH CR,ARKANSAS RV	007	11110207	Pulaski	63
AR0050113	GENE GRAVES ENTERPRISES, LLC-FOREST TOWER FOOD MART, INC	TRIB,KELLEY BR,DUCK CR,CLEAR CR,PENNINGTON BU,AR	027	8040203	Grant	64

Table A-28 (cont.): Segment 3C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0050130	CALLAGHAN CREEK POA, INC	CALLAGHAN CR,FOURCHE CR,ARKANSAS R	024	11110207	Pulaski	65
AR0050181	JOSIE COMPANY, LLC-ST JOSEPHS GLEN	TRIB,CROOKED CREEK,FOURCHE CR,AR RV	022	11110207	Saline	66
AR0050245	ALOTIAN CLUB, LLC	NOWLIN CR,LTL MAUMELLE R,ARKANSAS RV	020	11110207	Pulaski	67
AR0050393	WATERVIEW ESTATES POA	MILL BU,ARKANSAS RIVER	013	11110207	Pulaski	68
AR0050504	FERNDALE GROCERY, INC.	UNNAMED TRIB,LTL MAUMELLE RV,ARKANSAS RV	021	11110207	Pulaski	69
AR0050521	LOCHRIDGE ESTATES, LLC - SUBDIVISION	MCHENRY CR,FOURCHE CR,ARKANSAS RV	024	11110207	Pulaski	70
AR0050539	CENTRAL ARKANSAS UTILITY SERV,	TRIB,PANTHER CR,FOURCHE CR,ARKANSAS	024	11110207	Saline	71
AR0050547	TWO RIVERS HARBOR SUBDIVISION	ARKANSAS RV	012	11110207	Pulaski	72
AR0050628	MWM DEVELOPMENT, LLC, DEER CREEK SUBDIVISION	KELLY BR,DUCK CR,CLEAR CR,FERGUSON	027	11110207	Grant	73
AR0050636	SHANNON HILLS WWT FACILITY	OTTER CR,FOURCHE CR,ARKANSAS RV	024	11110207	Saline	74
AR0050679	HILLCREST CAMSHAFT SERVICE	DIT,FOURCHE CR,ARKANSAS RV	024	11110207	Pulaski	75
AR0050831	MOUND LAKE WWTP	DIT-BOBBY JONES RD,PLUM BU,ARK RV	004	11110207	Lonoke	76
AR0050849	LITTLE ROCK WW UTILITY-LITTLE MAUMELLE WWTP	ARKANSAS RV	012	11110207	Pulaski	77
AR0050890	DOWNHOME RESTAURANT & CATERING	TRIB,FOURCHE CR,ARKANSAS RV	024	11110207	Pulaski	78
AR0050971	DSL DEVELOPMENT, LLC	WILLOW SPGS BR,LTL FOURCHE CR,ARK RV	022	11110207	Pulaski	79
AR0051021	WRIGHTSVILLE, CITY OF	FOURCHE BU @ ARKANSAS RV	009	11110207	Pulaski	80
AR0051110	COLTEC INDUSTRIES INC.- CENTERAL MOLONEY	BRUMPS BU, LK SARACEN		11110207	Jefferson	81
AR0051144	TALL OAKS, LLC - HAYSTACK CAFE	TRIB,LTL MAUMELLE R,ARKANSAS RV	021	11110207	Pulaski	82
AR0051373	JUDY SURRETT - CHINA CAFE	TRIB,WILLOW SPRINGS BR,LITTLE FOURCHE CR, FOURCHE		11110207	Pulaski	83
AR0051454	CATERPILLAR, INC., NORTH AMERICAN MOTOR GRADER FAC	UNNAMED DITCH,FAULKNER LK, PLUM BAYOU, ARKANSAS RV		11110207	Pulaski	84
ARS000002	LITTLE ROCK, CITY OF/AHTD-MS4	TRIBS,ARKANSAS RV	022	11110207	Pulaski	85

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SEGMENT 3D ARKANSAS RIVER AND TRIBUTARIES: MURRAY LOCK AND DAM (#7) TO MORRILTON LOCK AND DAM (#9)

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

Summary of Water Quality Conditions

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.

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

East Fork Cadron Creek has been listed for exceeding the turbidity criterion. The source is listed as surface runoff, however, natural gas extraction activities (drilling and piping) continue in the watershed. These activities include drilling extraction wells, construction of pipelines to carry the natural gas from the wells to main distribution lines, and construction of hundreds of miles of unimproved roads to move construction equipment to and from the sites. Thousands of acres of land are exposed and thousands of streams are crossed during this process. Each acre and every stream crossing increases the nonpoint source input into the streams in the area.

Figure A-21: Planning Segment 3D

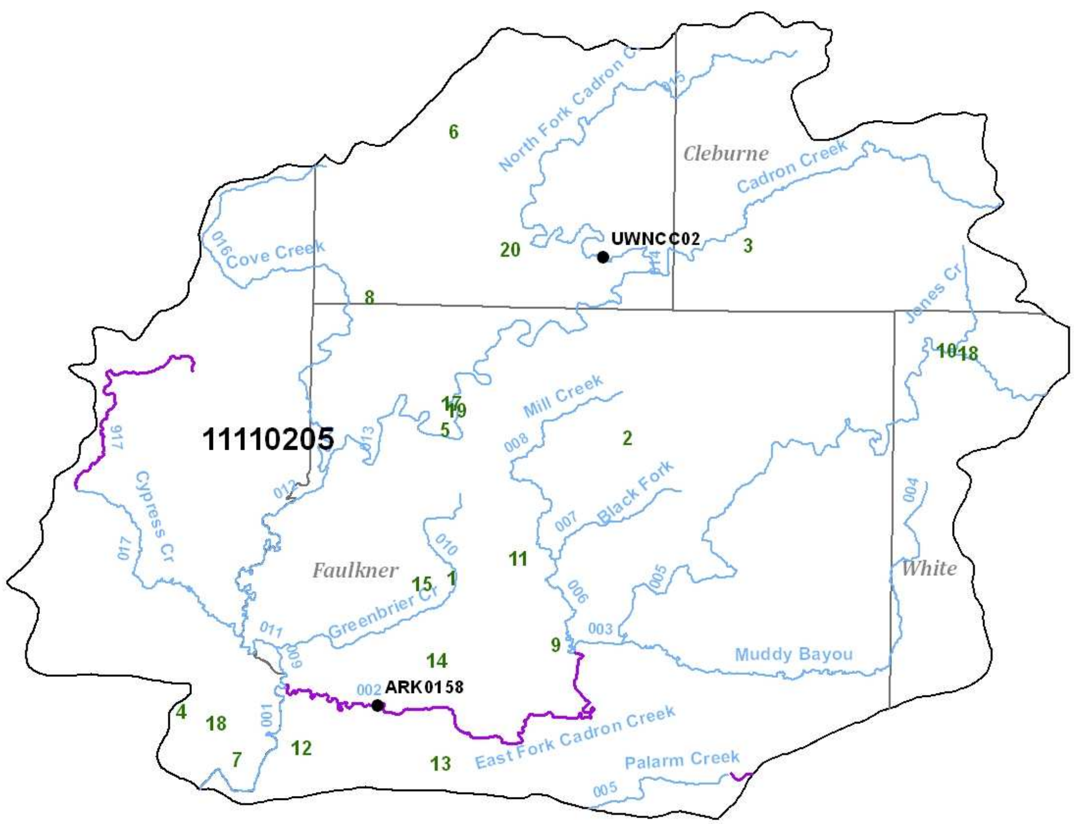


Table A-29: Planning Segment 3D—Designated Use Attainment Status and Water Quality Monitoring Stations

						Designated Use						SOURCE				CAUSE				STATUS			
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	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			
E. Fork Cadron	11110205	-002	15.6	ARK0158	M	S	S	S	S	S	S	SE				Tb				5			
E. Fork Cadron	11110205	-003	2.0		U	S	S	S	S	S	S									1			
E. Fork Cadron	11110205	-005	30.7	UWEFC02	M	S	S	S	S	S	S									1			
Muddy Bayou	11110205	-004	15.7		E	S	S	S	S	S	S									1			
Black Fork	11110205	-006	4.3		E	S	S	S	S	S	S									1			
Black Fork	11110205	-007	7.2		E	S	S	S	S	S	S									1			
Mill Creek	11110205	-008	8.9		E	S	S	S	S	S	S									1			
Cadron Creek	11110205	-009	0.7		E	S	S	S	S	S	S									1			
Cadron Creek	11110205	-011	2.2	UWCCR01	M	S	S	S	S	S	S									1			
Cadron Creek	11110205	-012	9.5		E	S	S	S	S	S	S									1			
Cadron Creek	11110205	-013	26.8	UWNCC01	M	S	S	S	S	S	S									1			
Cadron Creek	11110205	-014	14.7		E	S	S	S	S	S	S									1			
Greenbrier Cr.	11110205	-010	11.1		U	S	S	S	S	S	S									3			
North Cadron	11110205	-015	26.5	UWNCC02	M	S	S	S	S	S	S									1			
Cove Creek	11110205	-016	20.0		E	S	S	S	S	S	S									1			
Cypress Creek	11110205	-917	11.2	ARK0132	M	S	N	S	S	S	S	AG	AG			Cu	Zn			5	5		
Cypress Creek	11110205	-017	5.7	UWCSC01	M	S	S	S	S	S	S									1			
TOTAL MILES	220.5																						
MILES UNASSESSEI	13.1																						
MILES EVALUATED	88.7																						
MILES MONITORED	118.7																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	220.5	0
FISHERIES	209.3	11.2
PRIMARY CONTACT	220.5	0
SECONDARY CONTACT	220.5	0
DRINKING SUPPLY	220.5	0
AGRI & INDUSTRY	220.5	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0158	East Fork Cadron Creek near Wooster		1	A
UWEFC01	East Fork Cadron Creek at Highway 287, 3 miles southeast of Greenbrier		2	R
UWEFC02	East Fork Cadron Creek at Highway 107 near Barney		2	R
UWCCR01	Cadron Creek at county road, 5 miles west of Wooster		2	R
UWNCC01	North Cadron Creek at Highway 65 near Damascus		2	R
UWNCC02	North Cadron Creek at county road, 0.75 miles north of Highway 124		2	R
ARK0132	Cypress Creek at Highway 9 bridge near Cypress Valley		2	R
UWCSC01	Cypress Creek at county road, 2 miles southeast of Highway 92		2	R

Table A-30: Segment 3D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0036536	GREENBRIER, CITY OF	GREENBRIER CR,CADRON CR,AR RV	010	11110205	Faulkner	1
AR0037087	ARK PARKS WOOLY HOLLOW	BLACK FORK CR,E FK CADRON CR	007	11110205	Faulkner	2
AR0040321	QUITMAN, CITY OF	MILL CR,CADRON CR,ARKANSAS RV	014	11110205	Cleburne	3
AR0043028	GOOD EARTH HORTICULTURE, INC	TRIB,TANK LK,AR RV	010	11110205	Conway	4
AR0047112	ROGERS GROUP, INC-GREENBRIER Q	CADRON CR,ARKANSAS RV	013	11110205	Faulkner	5
AR0047457	CADRON CREEK CATFISH HOUSE	TRIB,WARD CR,PINE MTN CR,COVE CR,CADRON CR	013	11110205	Van Buren	6
AR0048119	EVERGREEN PACKAGING, INC. - CADRON CREEK CHIP MILL	CADRON CR, ARKANSAS RIVER	001	11110205	Conway	7
AR0049077	BLASS SCOUT RESERVATION	COVE CR,CADRON CR,ARKANSAS RV	016	11110205	Faulkner	8
AR0049620	ARKAVALLEY AIRPARK	TRIB,E FORK CADRON CR,CADRON CR	002	11110205	Faulkner	9
AR0049913	DOGWOOD MEADOWS	TRIB, E FORK CADRON CR,ARKANSAS RV	005	11110205	White	10
AR0050440	GREENBRIER, CITY OF - GREENBRIER SPORTS PARK	TRIB,BLACK FORK,E FORK CADRON CR,ARKANSAS R	007	11110205	Faulkner	11
AR0050466	SHADOW RIDGE WW TREATMENT FACI	E FK CADRON CR,CADRON CR,AR RV	002	11110205	Faulkner	12
AR0050491	NORTH HILLS SUBDIVISION WWTP	E FK CADRON CR,CADRON CR,AR RV	002	11110205	Faulkner	13
AR0050598	AR WATER & WASTEWATER MANAGEMENT CORP -HUNTINGTON ESTATES SUBDIVISION	KANEY CR,E FK CADRON CR,CADRON CR	002	11110205	Faulkner	14
AR0050768	STERLING MEADOWS SUB.WWTP	TRIB,GREENBRIER CR,CADRON CR,AR RV	010	11110205	Faulkner	15
AR0051004	EAGLE VIEW WWTF	DITCH, TRIB, LK ERLING, BODCAU BU	005	11140205	Lafayette	16
AR0051268	ARKANSAS SALTWATER RECYCLING	TRIB,CADRON CR,ARKANSAS R	013	11110205	Faulkner	17
AR0051403	NEALEY OF NW AR - CITY OF ROSE BUD SEWER IMPROVEMENTS PHASE I	EAST FORK CADRON CR, CADRON CR, ARKANSAS RV	005	11110205	White	18
AR0051705	ARKANSAS SALTWATER RECYCLING, LLC	DIT,UNNAMED TRIB CADRON CR,CADRON CR,ARKANSAS RV	013	11140205	Faulkner	19
AR0051756	SOUTHWESTERN ENERGY COMPANY - SWN DAMASCUS CAMP	TRIB,BATESVILLE CR,COVE CR,CADRON CR, AR RV	013	11110205	Van Buren	20

SEGMENT 3E FOURCHE LAFAVE RIVER

Segment 3E, located in west central Arkansas, includes portions of Perry, Yell, Scott Counties, Saline, and Polk Counties. This segment contains a 148-mile reach of the Fourche LaFave River and its tributaries; 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

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.

One reach of the Fourche LaFave River was assessed as not attaining the fisheries designated use due to excessive turbidity. Previous data have shown occasional periods of elevated turbidity values associated with agriculture and silviculture activities. However, the construction and maintenance of an abundance of unpaved roads for timber access and general transportation is likely to be another contributing factor. A TMDL was completed in 2007.

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

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-22: Planning Segment 3E

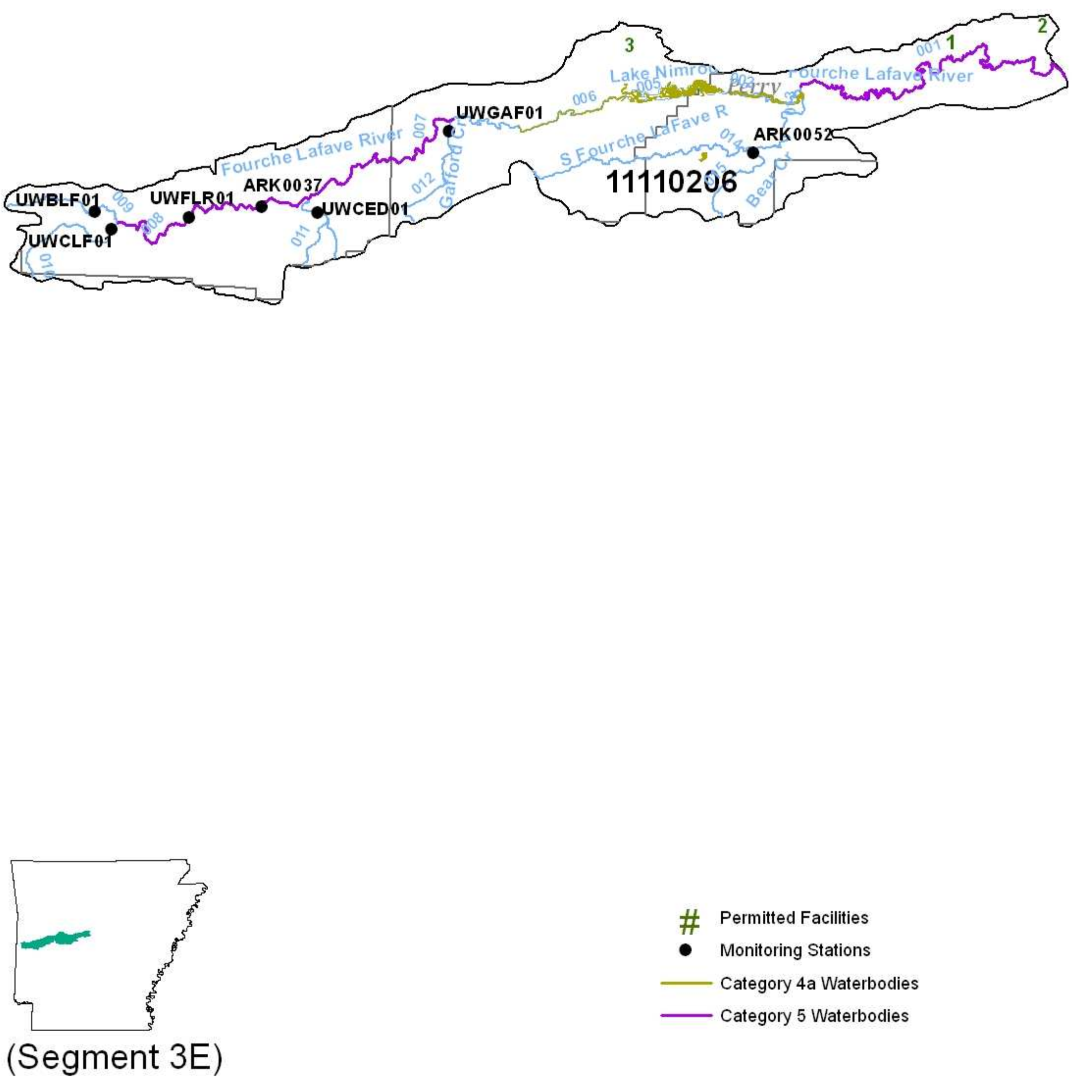


Table A-31: Planning Segment 3E—Designated Use Attainment Status and Water Quality Monitoring Stations

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-3E																										
Fourche LaFave	11110206	-001	44.4	ARK0036	M	S	S	S	S	S	S	UN				DO				5				FISH CONSUMPTION	192.6	8.7
Fourche LaFave	11110206	-002	8.7		E	N	S	S	S	S	S	UN				Hg				4a				FISHERIES	181.1	20.2
Fourche LaFave	11110206	-006	21.5		E	S	S	S	S	S	S									1				PRIMARY CONTACT	201.3	0
Fourche LaFave	11110206	-007	20.2	ARK0037+	M	S	N	S	S	S	S	UN				DO	Tb			5	4a			SECONDARY CONTACT	201.3	0
Fourche LaFave	11110206	-008	25.7	UWFLR01	M	S	S	S	S	S	S	UN				pH				5				DRINKING SUPPLY	201.3	0
Black Fork	11110206	-009	14.3	UWBLF01	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	201.3	0
Clear Fork	11110206	-010	12.0	UWCLF01	M	S	S	S	S	S	S									1						
Cedar Creek	11110206	-011	9.6	UWCED01	M	S	S	S	S	S	S									1						
Gafford Creek	11110206	-012	8.5	UWGAF01	M	S	S	S	S	S	S									5						
S.FourcheLaFave	11110206	-013	10.3		E	S	S	S	S	S	S									5						
S.FourcheLaFave	11110206	-014	26.1	ARK0052	M	S	S	S	S	S	S									5						
Bear Creek	11110206	-015	10.2		U															3						
TOTAL MILES	211.5																									
MILES UNASSESSED	10.2																									
MILES EVALUATED	40.5																									
MILES MONITORED	160.8																									

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

Table A-32: Segment 3E Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0020125	PERRYVILLE, CITY OF	FOURCHE LAFAVE R	001	11110206	Perry	1
AR0046957	EAST END SCHOOL DISTRICT	TRIB,MILL CR,FOURCHE LAFAVE RV,AR R	001	11110206	Perry	2
AR0049344	PLAINVIEW, CITY OF	SALLY SPRING BRANCH,LAKE NIMROD	004	11110206	Yell	3

SEGMENT 3F ARKANSAS RIVER

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

Summary of Water Quality Conditions

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.

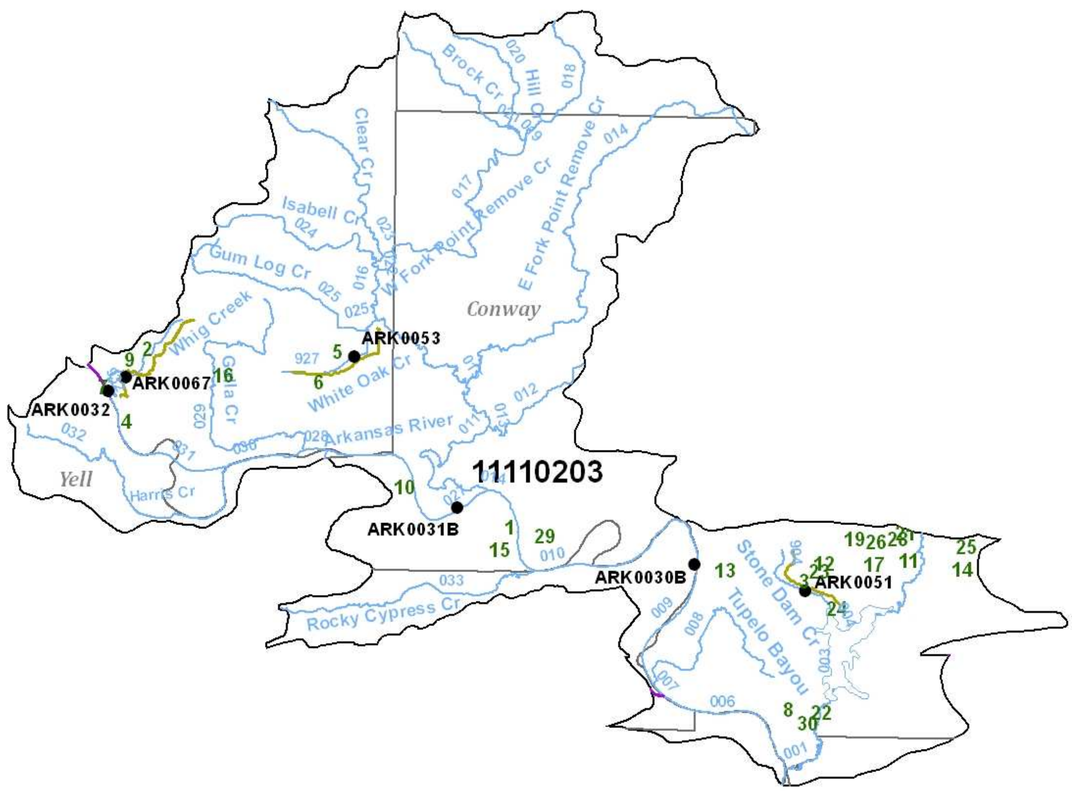
Stone Dam Creek is impaired by a municipal point source discharge. Chronic ammonia toxicity and elevated nitrate levels exceed the drinking water maximum contaminant level. A TMDL to address these issues was completed in 2003.

Whig Creek continues to be impaired by municipal and industrial point source discharges. Elevated levels of nutrients and copper are the cause of the impairment. TMDLs were completed for this waterbody in 2000 (Nitrite) and 2003 (copper).

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

An approximate two mile reach of the Arkansas River below Dardanelle Reservoir had dissolved oxygen values below the standard during the summer period. This is related to hydropower releases from the upstream reservoir when low DO 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 and in presence of photosynthetic activity from planktonic algae.

Figure A-23: Planning Segment 3F




(Segment 3F)

Table A-33: Planning Segment 3F—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-3F																							
Palarm Creek	11110203	-001	6.4		U																		
Stone Dam Creek	11110203	-904	3.0	ARK0051	M	S	N	S	S	N	S	MP	MP			AM	NO3			4a	4a		
Palarm Creek	11110203	-005	6.6	ARK0136	M	S	S	S	S	S	S									1			
Arkansas River	11110203	-006	10.9		E	S	S	S	S	S	S									1			
Arkansas River	11110203	-007	1.0		E	S	S	S	S	S	S									1			
Tupelo Bayou	11110203	-008	13.0		U	S	S	S	S	S	S									3			
Arkansas River	11110203	-009	10.6	ARK0030	M	S	S	S	S	S	S									1			
Arkansas River	11110203	-010	16.4		E	S	S	S	S	S	S									1			
Point Remove	11110203	-011	13.1		U	S	S	S	S	S	S									3			
Point Remove	11110203	-013	3.5		U	S	S	S	S	S	S									3			
Overcup Creek	11110203	-012	7.5		U	S	S	S	S	S	S									3			
East Pt.Remove	11110203	-014	20.9	UWEPR01	M	S	S	S	S	S	S									1			
West Pt.Remove	11110203	-015	8.2		U	S	S	S	S	S	S									3			
West Pt.Remove	11110203	-016	3.3	UWWPR01	M	S	S	S	S	S	S									1			
West Pt.Remove	11110203	-017	14.4	ARK0151	M	S	S	S	S	S	S									1			
West Pt.Remove	11110203	-019	4.1		E	S	S	S	S	S	S									1			
Beardy Branch	11110203	-018	12.9		E	S	S	S	S	S	S									1			
Hill Creek	11110203	-020	7.3		E	S	S	S	S	S	S									1			
Brock Creek	11110203	-021	7.4		E	S	S	S	S	S	S									1			
Clear Creek	11110203	-022	0.7		E	S	S	S	S	S	S									1			
Clear Creek	11110203	-023	11.7		E	S	S	S	S	S	S									1			
Isabel Creek	11110203	-024	10.5		E	S	S	S	S	S	S									1			
Gum Log Creek	11110203	-025	15.8		U	S	S	S	S	S	S									3			
Arkansas River	11110203	-026	2.6	ARK0031	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	S	S	S	S	S	S									3			
Arkansas River	11110203	-030	5.1		E	S	S	S	S	S	S									1			
Arkansas River	11110203	-932	2.0	special study	M	S	N	S	S	S	S	HP				DO				5			
Arkansas River	11110203	-031	9.4	ARK0032	M	S	S	S	S	S	S									1			
Harris Creek	11110203	-032	15.6		U	S	S	S	S	S	S									3			
Rocky Cypress	11110203	-033	15.7		U	S	S	S	S	S	S									3			
Whig Creek	11110203	-931	10.0	ARK0067	M	S	N	S	S	N	S	MP	MP			NO3	Cu			4a	4a		
White Oak Creek	11110203	-927	10.0	ARK0053	M	S	N	S	S	S	S	UN				Tb				4a			
TOTAL MILES	310.8																						
MILES UNASSESSED	118.9																						
MILES EVALUATED	99.1																						
MILES MONITORED	92.8																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	304.4	0
FISHERIES	279.4	25
PRIMARY CONTACT	304.4	0
SECONDARY CONTACT	304.4	0
DRINKING SUPPLY	291.4	13
AGRI & INDUSTRY	304.4	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0051	Stone Dam Creek below Conway		1	A
ARK0136	Palarm Creek at Highway 36 east of Conway		2	R
ARK0030B	Arkansas River at Lock and Dam No. 8	Y	1	A
UWEPR01	East Point Remove Creek at Highway 95 near Hickory Hill		2	R
UWWPR01	West Point Remove Creek at Highway 247 near Atkins		2	R
ARK0151	West Point Remove Creek at Highway 124 near Macedonia		2	R
ARK0031B	Arkansas River at Lock and Dam No. 9	Y	1	A
ARK0032	Arkansas River near Dardanelle	Y	1	A
ARK0067	Whig Creek below Russellville		1	A
ARK0053	White Oak Creek near Atkins		1	A

Table A-34: Segment 3F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0001830	GREEN BAY PACKAGING/ARKKRAFT	TRIB,ARKANSAS RV	010	11110203	Conway	1
AR0021768	RUSSELLVILLE-CITY CORPORATION	WHIG CR,ARKANSAS R	931	11110203	Pope	2
AR0033359	CONWAY, CITY OF-STONE DAM CREEK	TRIB,STONE DAM CR,LK CONWAY,PARLARM CR,ARK RV	904	11110203	Faulkner	3
AR0033421	DARDANELLE, CITY OF	ARKANSAS RV	031	11110203	Yell	4
AR0034665	ATKINS WATER WORKS	ARKANSAS RV	927	11110203	Pope	5
AR0034673	ATKINS, CITY OF-SOUTH WWTP	HORSEHEAD CR,GALLA CR,ARKANSAS RV	029	11110203	Pope	6
AR0036714	TYSON FOODS INC-DARDANELLE	ARKANSAS RV	031	11110203	Yell	7
AR0037206	MAYFLOWER, CITY OF	ARKANSAS RV	006	11110203	Faulkner	8
AR0044474	FREEMAN BROTHERS, INC.	TRIB,WHIG CR,AR RV	931	11110203	Pope	9
AR0044717	CAMP MITCHELL CONFERENCE CENTER	UNHNAMED TRIB,FLAT CYPRESS CR,CYPRESS CR, AR RV		11110203	Conway	10
AR0044997	BHT INVESTMENT COMPANY, INC.	TRIB,WARREN CR,PALARM CR,LK CONWAY, AR RV	005	11110203	Faulkner	11
AR0045071	MAPCO EXPRESS, INC. #3059	TRIB,STONE DAM CR,LK CONWAY,PALARM CR,AR RV	904	11110203	Faulkner	12
AR0047279	CONWAY, CITY OF-TUCKER CREEK WWTP	ARKANSAS RV	009	11110203	Faulkner	13
AR0047520	ROGERS GROUP, INC-BERYL QUARRY	TRIB,PALARM CR,LTL PALARM CR,PALARM CR, LK CONWAY	005	11110203	Faulkner	14
AR0047643	OPPELO, CITY OF	TRIB,CYPRESS CR,ARKANSAS RV	010	11110203	Conway	15
AR0048011	POTTSVILLE, CITY OF	TRIB,GALLA CR,ARKANSAS RV	029	11110203	Pope	16
AR0048879	FLUSHING MEADOWS WATER TREATMENT, INC.	TRIB,GOLD CR,LK CONWAY,PALARM CR,AR	004	11110203	Faulkner	17
AR0049361	MENIFEE, CITY OF	TRIB,GAP CR,ARKANSAS RV	010	11110203	Conway	18
AR0049832	JESSE FERREL RENTAL DEVELOP.	TRB,LTL CR,LK CONWAY,PALARM CR, AR RV	004	11110203	Faulkner	19
AR0049999	BIGELOW, CITY OF	TRIB,TAYLOR CR,ARKANSAS RV	009	11110203	Perry	20
AR0050253	FRITTS CONSTRUCTION, INC D/B/A	TRIB,BENTLEY CR,PALARM CR,AR RV	004	11110205	Faulkner	21
AR0050334	GRASSY LAKE APARTMENTS	TRIB,PARLARM CR,ARKANSAS RV	001	11110203	Faulkner	22
AR0050474	CORESLAB STRUCTURES (ARK), INC.	TRIB,STONE DAM CR,LK CONWAY,PALARM CR, AR RV	904	11110203	Faulkner	23
AR0050571	PRESTON WWTP	LK CONWAY,ARKANSAS RV	004	11110203	Faulkner	24
AR0050717	EAGLEBROOK SUBDIVISION	TRIB,LTL PARLARM CR,PARLARM CR,...	005	11110205	Faulkner	25
AR0050792	OAK TREE SUBDIVISION	BENTLEY CR,PALARM CR,LK CONWAY,AR R	005	11110203	Faulkner	26
AR0050903	FAULKNER COUNTY POID - SEVEN POINT LAKE PROJECT	TRIB,LT CYPRESS CR,PALARM CR,AR RV	005	11110203	Faulkner	27
AR0051152	GENESIS WATER TREATMENT, INC.	PALARM CR, ARKANSAS R	005	11110203	Faulkner	28
AR0051357	ENVIRONMENTAL SOLUTIONS & SERVICES, INC.	ARKANSAS RIVER	010	11110203	Conway	29
AR0051764	CONSTRUCTION WASTE MANAGEMENT, INC. CLASS IV LANDFILL	UNNAMED TRIB, PALARM CR, ARKANSAS RV	001	11110203	Faulkner	30

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

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. Primary land use within this segment is agriculture activities (primarily pasture land) and timber harvest.

Dutch Creek, an ecoregion reference stream, continues to be listed because of low dissolved oxygen concentrations. Most of the low dissolved oxygen readings occurred during the late summer to early fall when instream flow is minimal and the streams are reduced to small pools. This is a natural condition in small Ouachita Mountain ecoregion streams.

Figure A-25: Planning Segment 3G

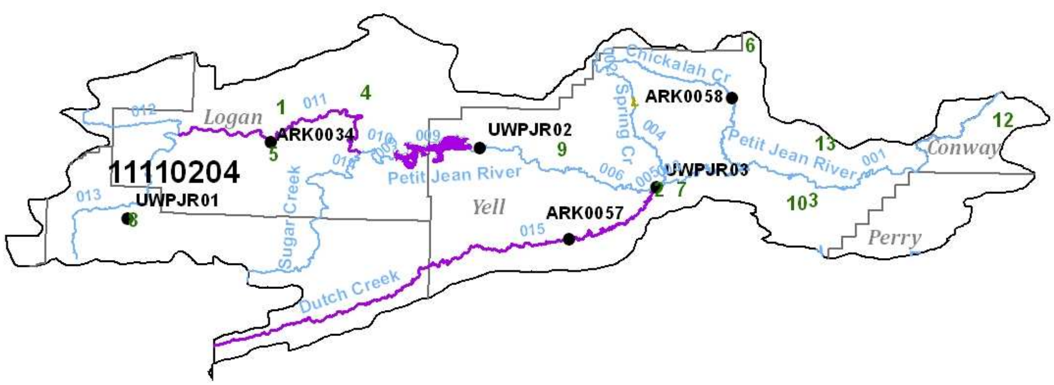


Table A-35: Planning Segment 3G—Designated Use Attainment Status and Water Quality Monitoring

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-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				FISHERIES	47.1	69.8
Petit Jean R.	11110204	-005	1.3	UWPJR03	M	S	S	S	S	S	S									1				PRIMARY CONTACT	116.9	0
Petit Jean R.	11110204	-006	17.9	UWPJR02	M	S	S	S	S	S	S									1				SECONDARY CONTACT	116.9	0
Petit Jean R.	11110204	-007	6.0		U															3				DRINKING SUPPLY	116.9	0
Petit Jean R.	11110204	-010	4.1		U															3				AGRI & INDUSTRY	116.9	0
Petit Jean R.	11110204	-011	21.6	ARK0034	M	S	N	S	S	S	S	SE				Tb				5						
Petit Jean R.	11110204	-013	19.2	UWPJR01	M	S	S	S	S	S	S									1						
Chickalah Cr.	11110204	-002	19.3	ARK0058	M	S	N	S	S	S	S									1						
Spring Creek	11110204	-004	18.6		U															3						
L. Washburn Cr.	11110204	-012	10.0		U															3						
Sugar Creek	11110204	-014	12.8		U															3						
Dutch Creek	11110204	-015	28.9	ARK0057	M	S	N	S	S	S	S	UN	SE			DO	Tb			5	5					
TOTAL MILES	198.5																									
MILES UNASSESSED	81.6																									
MILES EVALUATED	8.7																									
MILES MONITORED	108.2																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWPJR03	Petit Jean River at Highway 10 at Danville		2	R
UWPJR02	Petit Jean River at Highway 309 near Waveland		2	R
ARK0034	Petit Jean River south of Booneville	Y	1	A
UWPJR01	Petit Jean River at county road off Highway 71 at Elm Park		2	R
ARK0058	Chickalah Creek at Chickalah	Y	1	A
ARK0057	Dutch Creek below Shark	Y	1	A

Table A-36: Segment 3G Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0021571	BOONEVILLE, CITY OF	TRIB,COAL CR,PETIT JEAN RV,ARKANSAS	001	11110204	Logan	1
AR0022241	DANVILLE, CITY OF	PETIT JEAN RV	003	11110204	Yell	2
AR0035688	OLA, CITY OF	TRIB, KEELAND CR,PETIT JEAN RIVER,ARKANSAS RIVER	001	11110204	Yell	3
AR0037397	MAGAZINE, CITY OF	TRB,REVILLEE CR,PETIT JEAN RV, AR RV BASIN	011	11110204	Logan	4
AR0037541	BOONEVILLE HUMAN DEVELOPMENT	TRIB,PETIT JEAN RV,ARKANSAS RV	011	11110204	Logan	5
AR0037966	AR PARKS & TOURISM-MT NEBO STATE PARK	TRIB,LTL CHICKALAH CR,CHICKALAH CR,PETIT JEAN R,AR	002	11110204	Yell	6
AR0038768	WAYNE FARMS, LLC	PETIT JEAN RV,AR RV	003	11110204	Yell	7
AR0045799	AHTD DIST 4 - WALDRON REST AREA	TRIB,PETIT JEAN RIVER,ARKANSAS RIVER	013	11110204	Scott	8
AR0046256	HAVANA, CITY OF	PETIT JEAN RV,ARKANSAS RV	006	11110204	Yell	9
AR0048640	DELTIC TIMBER CORPORATION	KEELAND CR,PETIT JEAN RV,ARK RV	001	11110204	Yell	10
AR0048852	AR PARKS AND TOURISM-MT MAGAZINE STATE PARK	W BASS CR,SMALLW00D CR,ROCK CR,PETIT JEAN R, AR RV	006	11110204	Logan	11
AR0049972	ARK PARKS PETIT JEAN	DIT,CEDAR CR,PETIT JEAN RV,AR RV	001	11110204	Conway	12
AR0051195	CUSTOM WOOD RECYCLING, INC.	TRIB,PETIT JEAN RV, AR RV	001	11110204	Yell	13

SEGMENT 3H ARKANSAS RIVER AND TRIBUTARIES: OKLAHOMA 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, Van Buren, Searcy, Newton, Madison, Yell, and Washington Counties. This segment contains a reach of the Arkansas River from the Oklahoma state line to the lower end of Lake Dardanelle. Major tributaries in this reach include Illinois Bayou, Big Piney Creek, Lee Creek, Mulberry River, Six Mile Creek, and Vache Grasse Creek.

Summary of Water Quality Conditions

Waters within this segment are designated as suitable for the propagation of fish and wildlife; primary and secondary contact recreation; and public, industrial, and agricultural water supply.

Short Mountain Creek is not maintaining the fisheries designated use because of toxic copper concentrations. The source is thought to be a municipal point source discharge; however there are industrial facilities in the watershed just upstream of the sample location. Additional survey activities have been implemented to better determine the source(s) and impairment status of the creek.

One reach of the Mulberry River, an ecoregion reference stream, was listed because of low pH values. The statewide pH standard of 6 to 9 standard units does not take into account natural variations because of geology or land use. In addition, there were only three exceedances of the standard, the lowest of which was a 5.49 su reading. During the development of a Total Maximum Daily Load designed to address this issue, aquatic life data were collected. These data indicate no impairment to the aquatic communities in the stream. Thus, the fisheries designated use was evaluated as fully supporting, but the stream is still listed for not supporting the pH water quality standard.

Figure A-26: Planning Segment 3H

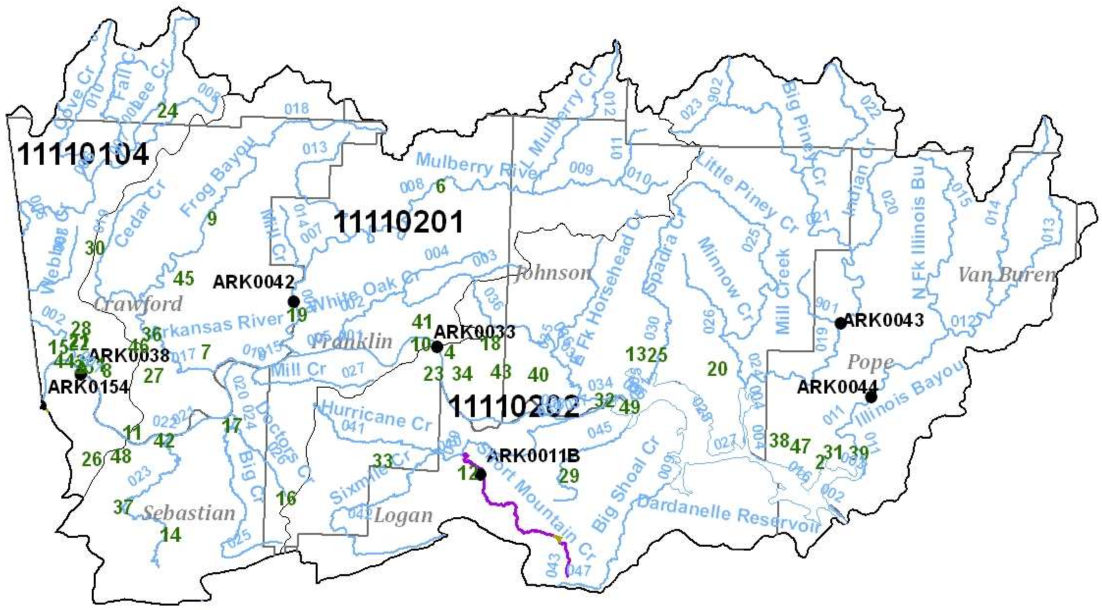


Table A-37: Planning Segment 3H—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4
SEG-3H																							
Arkansas River	11110202	-001	2.8		E	S	S	S	S	S	S									1			
Illinois Bayou	11110202	-011	21.0	ARK0044	M	S	S	S	S	S	S									1			
Illinois Bayou	11110202	-012	8.1	ARK0150	M	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	ARK0149	M	S	S	S	S	S	S									1			
N.Fk.Ill.Bayou.	11110202	-015	24.0		E	S	S	S	S	S	S									1			
Piney Creek	11110202	-018	5.8	ARK0105	M	S	S	S	S	S	S									1			
Piney Creek	11110202	-019	26.3	ARK0043	M	S	S	S	S	S	S									1			
Mill Creek	11110202	-901	8.6	ARK0110	M	S	S	S	S	S	S									1			
Indian Creek	11110202	-020	12.2	ARK0114	M	S	S	S	S	S	S									1			
Piney Creek	11110202	-021	11.9		E	S	S	S	S	S	S									1			
Hurricane Creek	11110202	-022	15.4	ARK0119	M	S	S	S	S	S	S									1			
Piney Creek	11110202	-023	19.0	ARK0124	M	S	S	S	S	S	S									1			
Walnut Creek	11110202	-902	5.1	ARK0125	M	S	S	S	S	S	S									1			
Little Piney	11110202	-024	6.2	ARK0104	M	S	S	S	S	S	S									1			
Minnow Creek	11110202	-026	9.5	ARK0129	M	S	S	S	S	S	S									1			
Little Piney	11110202	-025	27.2	ARK0126	M	S	S	S	S	S	S									1			
Spadra Creek	11110202	-030	15.1	ARK0148	M	S	S	S	S	S	S									1			
Arkansas River	11110202	-033	2.5		E	S	S	S	S	S	S									1			
Horsehead Cr.	11110202	-034	7.9		E	S	S	S	S	S	S									1			
Horsehead Cr.	11110202	-035	11.2	ARK0137	M	S	S	S	S	S	S									1			
McKinney Cr.	11110202	-036	11.8		E	S	S	S	S	S	S									1			
Arkansas River	11110202	-037	3.2		E	S	S	S	S	S	S									1			
Arkansas River	11110202	-038	16.2		E	S	S	S	S	S	S									1			
Sixmile Creek	11110202	-039	14.6		U															3			
Sixmile Creek	11110202	-040	3.0		U															3			
Hurricane Creek	11110202	-041	11.6		U															3			
Sixmile Creek	11110202	-042	10.7		U															3			
Short Mountain	11110202	-043	14.9	ARK0011B	M	S	N	S	S	S	S	MP				Cu				5			
Cane Creek	11110202	-045	12.3		U															3			
Big Shoal Cr.	11110202	-047	15.4		U															3			
Arkansas River	11110201	-001	12.4	ARK0033	M	S	S	S	S	S	S									1			
White Oak	11110201	-002	9.2		U															3			
S. Fork White Oak Cr.	11110201	-003	13.9		U															3			
N. Fork White Oak Cr.	11110201	-004	8.8		U															3			
Arkansas River	11110201	-005	4.5		U															3			
Mulberry River	11110201	-006	10.4	ARK0042	M	S	S	S	S	S	S									1			
Mulberry River	11110201	-007	6.4		E	S	S	S	S	S	S									1			
Mulberry River	11110201	-008	27.2	ARK0139	M	S	S	S	S	S	S									1			
Mulberry River	11110201	-009	9.1	ARK0138	M	S	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		E	S	S	S	S	S	S									1			
Little Mulberry	11110201	-012	17.4		M	S	S	S	S	S	S									1			
Hurricane Creek	11110201	-013	14.8		E	S	S	S	S	S	S									1			
Mill Creek	11110201	-014	7.0		E	S	S	S	S	S	S									1			
Arkansas River	11110201	-015	3.9		E	S	S	S	S	S	S									1			
Arkansas River	11110201	-016	2.9		E	S	S	S	S	S	S									1			
Frog Bayou	11110201	-017	15.7		E	S	S	S	S	S	S									1			
Frog Bayou	11110201	-018	20.4	ARK0047	M	S	S	S	S	S	S									1			
Cedar Creek	11110201	-019	17.0		E	S	S	S	S	S	S									1			
Arkansas River	11110201	-020	3.5		E	S	S	S	S	S	S									1			
Arkansas River	11110201	-021	7.0		E	S	S	S	S	S	S									1			
Arkansas River	11110201	-022	3.0		E	S	S	S	S	S	S									1			
L. Vache Grass	11110201	-023	20.5		U															3			
Doctors Creek	11110201	-024	1.5		U															3			
Big Creek	11110201	-025	20.9		U															3			
Doctors Creek	11110201	-026	9.1		U															3			
Mill Creek	11110201	-027	11.9		U															3			

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	510.4	0
FISHERIES	495.5	14.9
PRIMARY CONTACT	510.4	0
SECONDARY CONTACT	510.4	0
DRINKING SUPPLY	510.4	0
AGRI & INDUSTRY	510.4	0

Table A-37 (cont.): Planning Segment 3H—Designated Use Attainment Status and Water Quality Monitoring

						Designated Use						SOURCE				CAUSE				STATUS					
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	AL	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT NOT SUPPORT
Arkansas River	11110104	-001	11.0	ARK0038	M																				
Arkansas River	11110104	-013	17.0	ARK0146	M																				
Lee Creek	11110104	-002	10.5	ARK0008	M																				
Lee Creek	11110104	-005	11.4		E																				
Lee Creek	11110104	-006	4.4	UWLCK01	M																				
Lee Creek	11110104	-007	1.8		E																				
Lee Creek	11110104	-008	12.3		E																				
Fall Creek	11110104	-009	15.2		E																				
Cove Creek	11110104	-010	13.3		E																				
Mt. Fork Creek	11110104	-011	18.9		E																				

TOTAL MILES	794.1
MILES UNASSESSED	167.9
MILES EVALUATED	261.0
MILES MONITORED	365.2

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0044	Illinois Bayou northwest of Dover	Y	1	A
ARK0149	North Fork Illinois Bayou on county road north of Scottsville		2	R
ARK0150	Illinois Bayou at Highway 27 north of Hector		2	R
ARK0105	Big Piney Creek at Highway 359, 6 miles east of Lamar		2	S
ARK0043	Big Piney Creek at Highway 164	Y	1	A
ARK0110	Mill Creek at county road 0.4 miles south of Highway 164 near Twin Bridges		2	S
ARK0114	Indian Creek at FAS road 1808 near Treat		2	S
ARK0119	Hurricane Creek at FAS road 1003 near Ft. Douglas		2	S
ARK0124	Big Piney Creek at FAS road 1458 south of Edwards Junction		2	S
ARK0125	Walnut Creek as FAS road 1217 south of Edwards Junction		2	S
ARK0104	Little Piney Creek at Highway 359 east of Lamar		2	R
ARK0129	Minnow Creek at county road 50 bridge, south of Hagarville		2	S
ARK0109	Unnamed tributary at Highway 164 bridge		2	S
ARK0126	Little Piney Creek at Highway 123 bridge near Hagarville		2	S
ARK0148	Spadra Creek at US 64 near Clarksville		2	R
ARK0137	Horsehead Creek at Highway 64 east of Hartman		2	R
ARK0011B	Short Mountain Creek below Paris		1	A
ARK0033	Arkansas River at Ozark Lock and Dam	Y	1	A
ARK0042	Mulberry River at I-40	Y	1	A
ARK0138	Mulberry River at Highway 103 west of Oark		2	R
ARK0139	Mulberry River 4.3 miles east of Highway 23 near Cass		2	R
ARK0047	Frog Bayou at Highway 282		2	A
ARK0038	Arkansas River near Fort Smith, AR.	Y	1	A
ARK0146	Arkansas River below Mayo Lock and Dam		2	A
ARK0008	Lee Creek at Highway 59 near Natural Dam		2	R
UWLCK01	Lee Creek at Highway 220, 10 miles north of Cedarville		2	R

Table A-38: Segment 3H Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0001341	APAC-CENTRAL, INC. - D/B/A VAN BUREN SAND	ARKANSAS RV	001	11110104	Crawford	1
AR0001392	ENTERGY ARKANSAS-RUSSELLVILLE	LK DARDANELLE,AR RV	004	11110202	Pope	2
AR0001511	GERBER PRODUCTS COMPANY	ARKANSAS RV	001	11110104	Sebastian	3
AR0001759	ARKANSAS ELECTRIC COOP-FITZHUGH GENERATING STATION	TRIB,ARKANSAS RV	038	11110202	Franklin	4
AR0001791	DIXIE CONSUMER PRODUCTS LLC;	UNNAMED DIT,6TH ST DIT,ARKANSAS RV	001	11110104	Sebastian	5
AR0020648	USDAFS-CASS CIVILIAN CONSERVATION CENTER	MULBERRY RV, AR RV	008	11110201	Franklin	6
AR0021466	ALMA, CITY OF	ARKANSAS RV	016	11110201	Crawford	7
AR0021482	VAN BUREN, CITY OF-MAIN PLANT	ARKANSAS RV	001	11110104	Crawford	8
AR0021512	MOUNTAINBURG, CITY OF	TRIB,HWY 282 DITCH,FROG BU,AR RV	018	11110201	Crawford	9
AR0021563	OZARK, CITY OF	ARKANSAS RV	001	11110201	Franklin	10
AR0021750	FORT SMITH, CITY OF-MASSARD WWTP	ARKANSAS RV	001	11110104	Sebastian	11
AR0021857	PARIS, CITY OF	SHORT MOUNTAIN CR,6-MILE CR	043	11110202	Logan	12
AR0022187	CLARKSVILLE, CITY OF	LK DARDANELLE (1) & SPADRE CR (2)	006	11110202	Johnson	13
AR0022454	GREENWOOD, CITY OF	TRIB,VACHE GRASSE CR,ARKANSAS RV	023	11110201	Sebastian	14
AR0033278	FORT SMITH, CITY OF	ARKANSAS RV	013	11110104	Crawford	15
AR0033791	CHARLESTON, CITY OF	DOCTORS CR,BIG CR,AR RV	026	11110201	Franklin	16
AR0034070	LAVACA, CITY OF	ARKANSAS RV	021	11110201	Sebastian	17
AR0034592	WIEDERKEHR WINE CELLARS INC	WATERSHED LK,DIRTY CR,HORSEHEAD CR	034	11110202	Franklin	18
AR0034932	MULBERRY, CITY OF	ARKANSAS RV	005	11110201	Crawford	19
AR0035491	LAMAR, CITY OF	TRIB,CABIN CR,ARKANSAS RV	008	11110202	Johnson	20
AR0036552	BEKAERT CORPORATION	ARKANSAS RV	013	11110104	Crawford	21
AR0037567	VAN BUREN/LEE CREEK IND PARK	ARKANSAS RV	002	11110104	Crawford	22
AR0037851	SGL CARBON LLC	TRIB,WEST CR,ARKANSAS RIVER	038	11110201	Franklin	23
AR0037940	ARK PARKS DEVIL'S DEN	DIT,LEE CR,ARKANSAS RV	009	11110104	Washington	24
AR0039268	TYSON FOODS INC-CLARKSVILLE	BLUE CR,SPADRA CR, AR RV	030	11110202	Johnson	25
AR0039730	GERDAU MACSTEEL	TRIB,MASSARD CR,ARKANSAS RV	001	11110104	Sebastian	26
AR0040720	VAN BUREN SCHOOL-TATE ELEM	TRIB,MAYS BRANCH,ARKANSAS RV	021	11110201	Crawford	27
AR0040967	VAN BUREN, CITY OF NORTH WWTP	LEE CR,ARKANSAS RV	002	11110104	Crawford	28
AR0040991	SUBIACO, TOWN OF	TRIB,CANE CR,ARKANSAS RV	045	11110202	Logan	29
AR0041289	CEDARVILLE PUBLIC SCHOOLS	LTL WEBER CR TRIB,LEE CR	003	11110104	Crawford	30
AR0042447	LAKE POINT CONFERENCE CENTER	LK DARDENELLE,ARKANSAS RV	003	11110202	Pope	31
AR0042455	TYSON FOODS INC-RIVER VALLEY ANIMAL FOODS	ARKANSAS RV	033	11110202	Logan	32
AR0044636	COUNTY LINE SCHOOL DISTRICT	N FK/LITTLE CR,LITTLE CR,6-MILE CR,ARKANSAS RV	042	11110202	Logan	33

Table A-38 (cont.): Segment 3H Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0044725	ALTUS, CITY OF	ARKANSAS RV	038	11110202	Franklin	34
AR0044938	ECOLOGY MANAGEMENT, INC WASTEW	ARKANSAS RV	001	11110104	Sebastian	35
AR0045063	APAC-CENTRAL, INC. D/B/A PRESTON QUARRY	UNMAMED TRIB,FLAT ROCK CR,ARKANSAS RV	022	11110201	Crawford	36
AR0045365	ARKHOLA-JENNY LIND QUARRY	TRIB,BEAR CR,VACHE GRASSE CR,AR RV	023	11110201	Sebastian	37
AR0045691	AHTD DIST 8 - BIG PINEY REST AREA	TRIB,LAKE DARDENELLE,ARKANSAS RIVER	004	11110202	Pope	38
AR0046396	PLEASANT VIEW ESTATES	TRB,LK DARDANELLE, ARK RV	003	11110202	Pope	39
AR0047686	COAL HILL, CITY OF	ARKANSAS RV	038	11110202	Johnson	40
AR0048267	BUTTERBALL, LLC - OZARK TURKEY PROCESSING PLANT	ARKANSAS RV	001	11110201	Franklin	41
AR0048801	BARLING, CITY OF	ARKANSAS RV	022	11110201	Sebastian	42
AR0049212	BUTTERBALL, LLC - ALIX FEED MILL	TRIB,CEDAR CR,ARKANSAS R	038	11110202	Franklin	43
AR0049808	SAINT GOBAIN PROP PANTS	DIT,ARKANSAS RV	001	11110104	Sebastian	44
AR0050725	HTC, LLC - d/b/a/ HILLTOP TRAVEL CENTER	I-540 DIT,TRIB,LK ALMA,LTL FROG BU	018	11110201	Crawford	45
AR0050938	CONCORD WATER-CABANA ESTATES	TRIB,FLAT ROCK CR,HOLLIS LK,FLAT ROCK CR, ARK	001	11110104	Crawford	46
AR0050946	LONDON, CITY OF	LAKE DARDANELLE	013	11110202	Pope	47
AR0051012	MARS PETCARE U.S., INC.	TRIB,LITTLE VACHE GRASSE CR,ARKANSAS RV	023	11110201	Sebastian	48
AR0051471	PAUL J. DEAN D/B/A - PORKYS ONE STOP	UNMAMED TRIB, CANE CR,ARKANSAS RV	045	11110202	Logan	49

SEGMENT 3I POTEAU RIVER

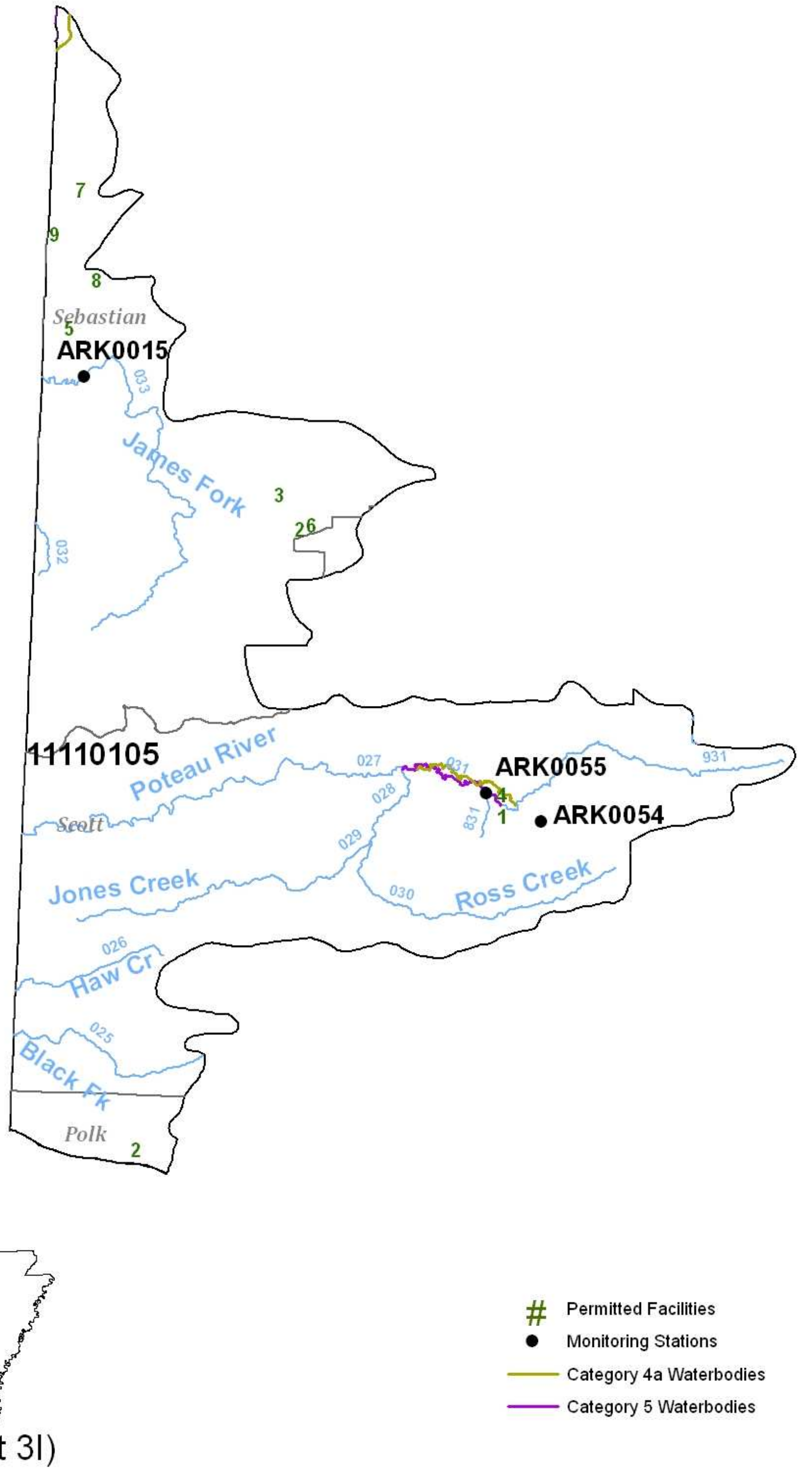
Segment 3I is located on the western edge of Arkansas, just south of the Arkansas River. This segment includes large portions of Scott and Sebastian Counties and a small part of northwestern Polk County. The waters of this segment include the Poteau River from its headwaters to the Oklahoma state line, as well as the tributary streams. Major tributaries include Jones Creek and James Fork.

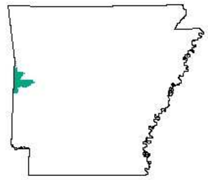
Summary of Water Quality Condition

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.

A short section of the Poteau River below the city of Waldron was listed as not supporting the fisheries designated use due to elevated metals and total phosphorus. Both a municipal and industrial discharge occurs in this segment. In addition, a short section of the Poteau River just above its confluence with the Arkansas River was listed as not supporting the fisheries designated use because of excessive turbidity. A TMDL to address some of these issues was completed in 2006.

Figure A-27: Planning Segment 3I





(Segment 3I)

Table A-39: Planning Segment 3I—Designated Use Attainment Status and Water Quality Monitoring Stations

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-3I																										
Poteau River	11110105	-001	2.0	ARK0014	M	s	N	s	s	s	s	UIN	SE			DO	Tb			5	4a			FISH CONSUMPTION	105.3	0
Black Fork	11110105	-025	8.0		U	s	s	s	s	s	s													FISHERIES	96.7	8.6
Poteau River	11110105	-027	16.0	USGS	M	s	s	s	s	s	s													PRIMARY CONTACT	105.3	0
Hawes Creek	11110105	-026	11.6		U	s	s	s	s	s	s													SECONDARY CONTACT	105.3	0
Jones Creek	11110105	-028	4.0		U	s	s	s	s	s	s													DRINKING SUPPLY	98.7	6.6
Jones Creek	11110105	-029	11.6		U	s	s	s	s	s	s													AGRI & INDUSTRY	98.7	6.6
Ross Creek	11110105	-030	14.3		U	s	s	s	s	s	s															
Poteau River	11110105	-931	12.8	ARK0054	M	s	s	s	s	s	s															
Poteau River	11110105	-031	6.6	ARK0055	M	s	N	s	s	N	N	MP/IP				TDS	1			5	5	4a				
James Fork	11110105	-033	18.4	ARK0015	M	s	s	s	s	s	s															
TOTAL MILES	105.3															1 = CU, Zn, & TP										
MILES UNASSESSED	49.5																									
MILES EVALUATED	0.0																									
MILES MONITORED	55.8																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0154	Poteau River near Fort Smith		1	A
ARK0014	Poteau River near Fort Smith		1	A
ARK0054	Poteau River above Waldron	Y	1	A
ARK0055	Poteau River below Waldron	Y	1	A
ARK0015	James Fork near Hacket	Y	1	A

Table A-40: Segment 3I Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0035769	WALDRON, CITY OF	TRIB,POTEAU RV,ARKANSAS RV	031	11110105	Scott	1
AR0036293	MANSFIELD, CITY OF	COOP CR,CHEROKEE CR,PRAIRIE CR	033	11110105	Sebastian	2
AR0037419	HUNTINGTON, CITY OF	CHEROKEE CR,PRAIRIE CR,JAMES FK RV	033	11110105	Sebastian	3
AR0038482	TYSON FOODS, INC. - WALDRON	TRIB,POTEAU R,ARKANSAS RV	031	11110105	Scott	4
AR0039781	HACKETT, CITY OF	BIG BR HACKETT CR,JAMES FK,POTEAU RV	033	11110105	Sebastian	5
AR0048232	TRAVIS LUMBER COMPANY, INC	TRIB,COOP CR,CHEROKEE CR,PRAIRIE CR	033	11110105	Scott	6
AR0050431	SOUTHERN HILLS LLC-BLACKSTONE	CEDAR CR,POTEAU RV,ARKANSAS RV	001	11110105	Sebastian	7
AR0051039	SEBASTIAN LAKE PUBLIC WATER	TRIB, HACKET CR, JAMES FK, POTEAU RV, AR RV	027	11010105	Sebastian	8
AR0051080	BONANZA, TOWN OF	TRIB,WELLS CR,POTEAU RV,AR RV		11110104	Sebastian	9

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

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.

Nonpoint source impacts affecting waters in this segment are primarily from urban development, and pasture land which generally receives applications of poultry waste products. Instream gravel removal destabilizes the streambed and causes excessive bank erosion. Road construction and maintenance also contributes to siltation problems. Three major municipal, point source discharges enter the Illinois River via Osage Creek and Clear Creek, and a minor municipal discharge enters the Illinois River from Muddy Fork of the Illinois River.

Several waste treatment facilities in Segment 3J have upgraded their facilities for advanced phosphorus removal. Analysis of phosphorus data over the past ten years indicate a decreasing trend in phosphorus concentrations in the Illinois River near Siloam Springs (Figure A-29), Osage Creek (Figure A-30), and Little Sugar Creek near Bentonville (Figure A-31).

The fisheries designated use in Town Branch Creek is currently listed as impaired because of historic excessive nutrient loads being discharged from the local municipal point source. However, upgrades to the waste water treatment facility have reduced the nutrient loading to the stream.

Figure A-28: Planning Segment 3J

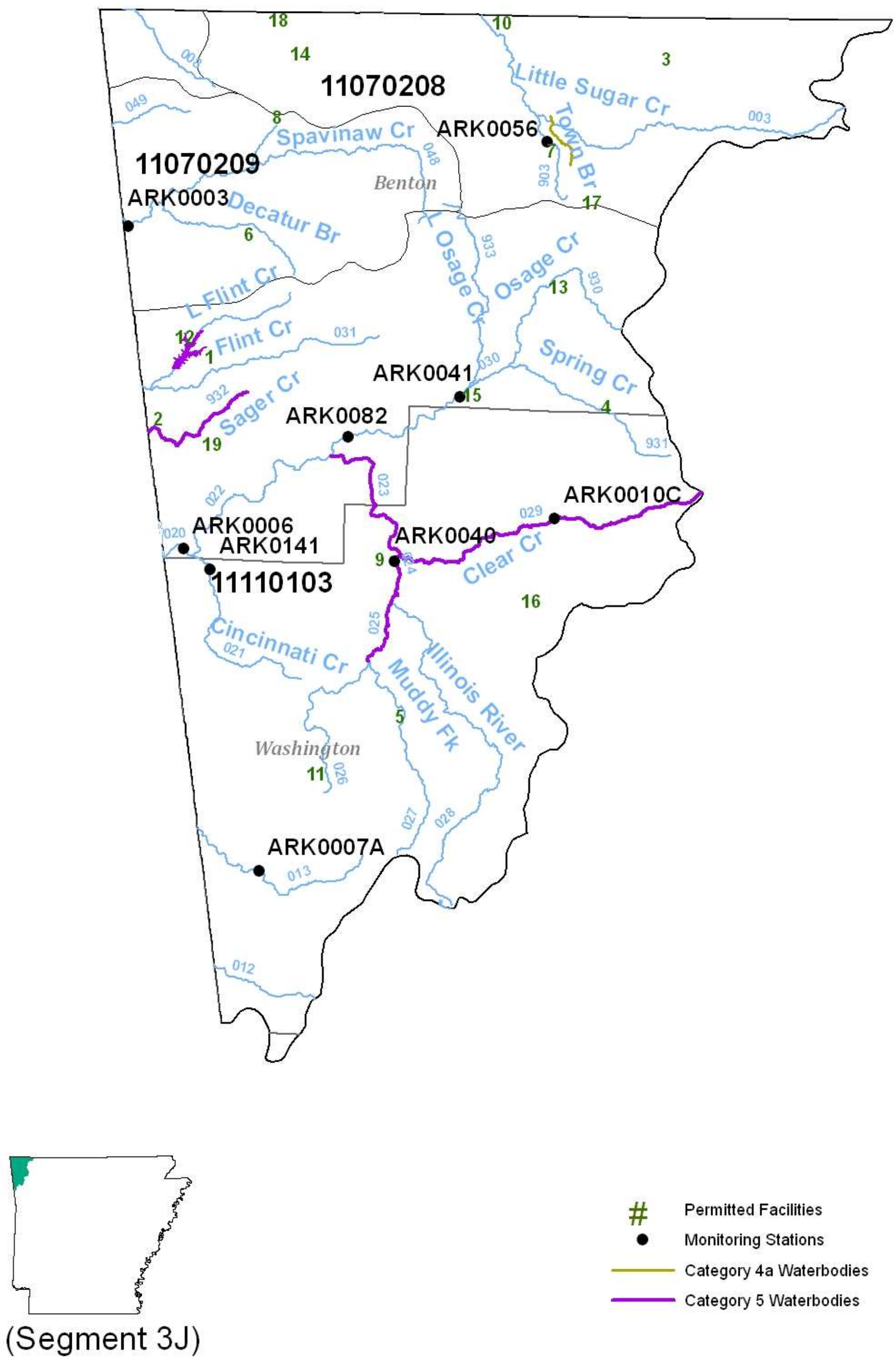


Table A-41: Planning Segment 3J—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4
SEG-3J																							
Evansville Cr.	11110103	-012	9.0		U															3			
Baron Fork	11110103	-013	10.0	ARK0007A+	M	S	S	S	S	S	S									1			
Illinois River	11110103	-020	1.6	ARK0006	M	S	S	S	S	S	S									1			
Cincinnati Cr.	11110103	-021	9.0	ARK0141	M	S	S	S	S	S	S									1			
Illinois River	11110103	-022	10.8	ARK0006A	M	S	S	S	S	S	S									1			
Illinois River	11110103	-023	8.1	ILL04	M	S	S	N	S	S	S	PA				AG				1			
Illinois River	11110103	-024	2.5	ARK0040	M	S	S	N	S	S	S	Tb	PA			SE	AG			1			
Muddy Fork.	11110103	-025	3.2	MFI04+	M	S	S	N	S	S	S	PA				AG				1			
Moores Creek	11110103	-026	9.8		E	S	S	S	S	S	S									1			
Muddy Fork	11110103	-027	11.0	MFI02B+	M	S	S	S	S	S	S									1			
Illinois River	11110103	-028	19.9	ILL01	M	S	S	S	S	S	S									1			
Clear Creek	11110103	-029	13.5	ARK0010C	M	S	S	N	S	S	S	PA				UR				1			
Osage Creek	11110103	-030	15.0	ARK0041	M	S	S	S	S	S	S									1			
Osage Creek	11110103	-930	10.2	OSC03+	M	S	S	S	S	S	S									1			
L. Osage Creek	11110103	-933	11.9	ARK0155	M	S	S	S	S	S	S									1			
Spring Creek	11110103	-931	8.4	SPG03+	M	S	S	S	S	S	S									1			
Flint Creek	11110103	-031	9.6	ARK0004A	M	S	S	S	S	S	S									1			
Sager Creek	11110103	-932	8.0	ARK0005	M	S	S	S	S	N	S									1			
Spavinaw Cr.	11070209	-048	19.3	ARK0003	M	S	S	S	S	S	S									1			
Beaty Creek	11070209	-049	5.2		U															3			
Little Sugar	11070208	-003	24.2	ARK0001	M	S	S	S	S	S	S									1			
Town Branch	11070208	-903	3.0	ARK0056	M	S	S	S	S	S	S	TP				MP				4a			
TOTAL MILES	223.2																						
MILES UNASSESSED	14.2																						
MILES EVALUATED	9.8																						
MILES MONITORED	199.2																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	209	0
FISHERIES	209	0
PRIMARY CONTACT	181.7	27.3
SECONDARY CONTAC	209	0
DRINKING SUPPLY	201	8
AGRI & INDUSTRY	209	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
ARK0007A	Barren Fork at county road 11 near Dutch Mills	Y	1	A
ARK0006	Illinois River at Highway 59	Y	1	A
ARK0141	Cincinnati Creek at Highway 244		1	A
ARK0040	Illinois River near Savoy	Y	1	A
MFI04+	Muddy Fork Illinois River at Highway 156 north of Viney Grove		2	S
MFI02B+	Muddy Fork Illinois River on county road west of Viney Grove		2	S
ILL01	Illinois River east of Highway 156 north of Viney Grove		2	S
ARK0010C	Clear Creek below Fayetteville		1	A
ARK0041	Osage Creek near Elm Springs	Y	1	A
OSC03+	Osage Creek off of Highway 112 south of Cave Springs near Elm Springs		2	S
SPG03+	Spring Creek Highway 112 south of Cave Springs		2	S
ARK0004A	Flint Creek near Siloam Springs	Y	1	A
ARK0005	Sager Creek near Siloam Springs		1	A
ARK0003	Spavinaw Creek north of Cherokee	Y	1	A
ARK0001	Little Sugar Creek near Bella Vista		1	A
ARK0056	Town Branch below Bentonville		1	A

Table A-42: Segment 3J Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0020184	GENTRY, CITY OF	ASH POND,SWEPCO RSRV,LTL FLINT CR	031	11110103	Benton	1
AR0020273	SILOAM SPRINGS, CITY OF	SAGER CR,FLINT CR,ILLINOIS RV	032	11110103	Benton	2
AR0020672	PEA RIDGE, CITY OF	OTTER CR,BIG SUGAR CR,ELK RV,NEOSHO	004	11070208	Benton	3
AR0022063	SPRINGDALE, CITY OF	SPRING CR,OSAGE CR,ILLINOIS RV	931	11110103	Benton	4
AR0022098	PRAIRIE GROVE, CITY OF	MUDDY FK/ILLINOIS RV	027	11110103	Washington	5
AR0022292	DECATUR, CITY OF	COLUMBIA HOLLOW CR,SPAVINAW CR	048	11070209	Benton	6
AR0022403	BENTONVILLE, CITY OF	TOWN BR,LTL SUGAR CR	903	11070208	Benton	7
AR0023833	GRAVETTE, CITY OF	RR HOLLOW,SPAVINAW CR,GRAND NEOSHO	048	11070209	Benton	8
AR0033910	USDAFS-LAKE WEDINGTON REC AREA	TRIB, ILLINOIS R, ARKANSAS R	023	11110103	Washington	9
AR0034258	VILLAGE WASTEWATER COMPANY, INC.	LTL SUGAR CR,ARKANSAS RV	003	11070208	Benton	10
AR0035246	LINCOLN, CITY OF	TRIB,BUSH CR,BARON FORK CR,ILLINOIS	026	11110103	Washington	11
AR0037842	AEP-SWEPCO FLINT CREEK POWER PLANT	SWEPCO RSRVR,LT FLINT CR,FLINT CR	031	11110103	Benton	12
AR0043397	ROGERS, CITY OF	1-OSAGE CR,IL RV; 2-PINNACLE GOLF	930	11110103	Benton	13
AR0046639	BENTON COUNTY STONE CO, INC	TRIB,BUTLER CR,ELK RV		11070208	Benton	14
AR0050024	NORTHWEST AR CONSERVATION AUTH	OSAGE CR,ILLINOIS RV	030	11110103	Benton	15
AR0050288	FAYETTEVILLE/WEST SIDE WWTP	GOOSE CR,ILLINOIS RV,ARKANSAS RV	028	11110103	Washington	16
AR0050652	WAL-MART STORES, INC. - EAST DATA CENTER	TRIB,OSAGE CR,ILLINOIS RIVER,ARKANSAS RV	930	11110103	Benton	17
AR0051179	SULPHUR SPRINGS, CITY OF	BUTTER CR		11070208	Benton	18
AR0051331	SPRINGDALE IRON & METAL	TRIB SAGER CR,SAGER CR, ARKANSAS RV	932	11110103	Benton	19

Figure A-29: Illinois River (ARK0006) Total Phosphorus trend since 1990

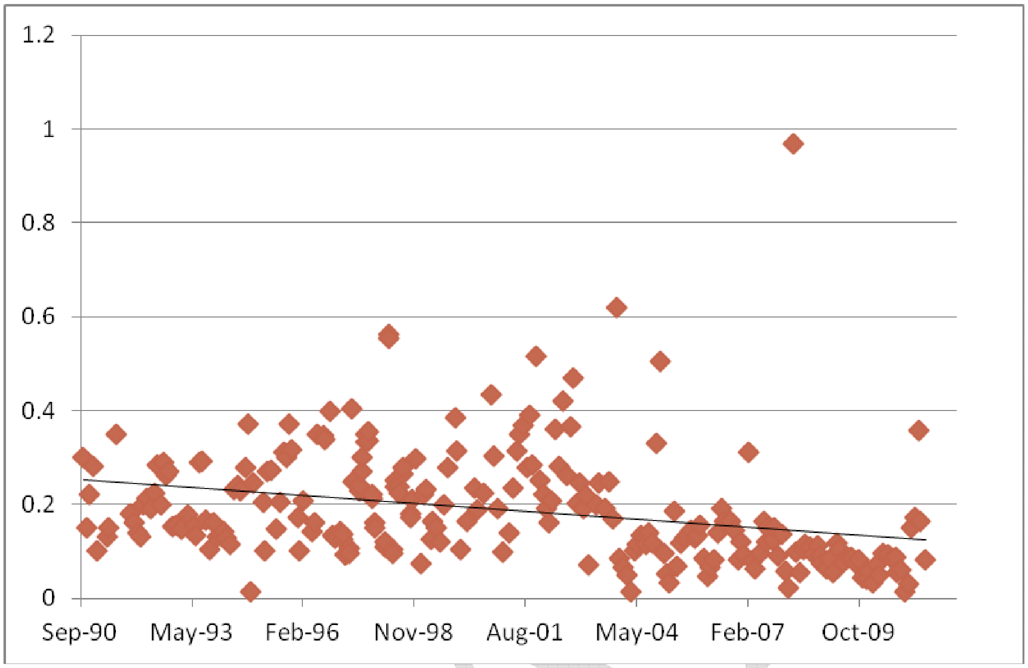


Figure A-30: Osage Creek (ARK0041) Total Phosphorus trend since 2002

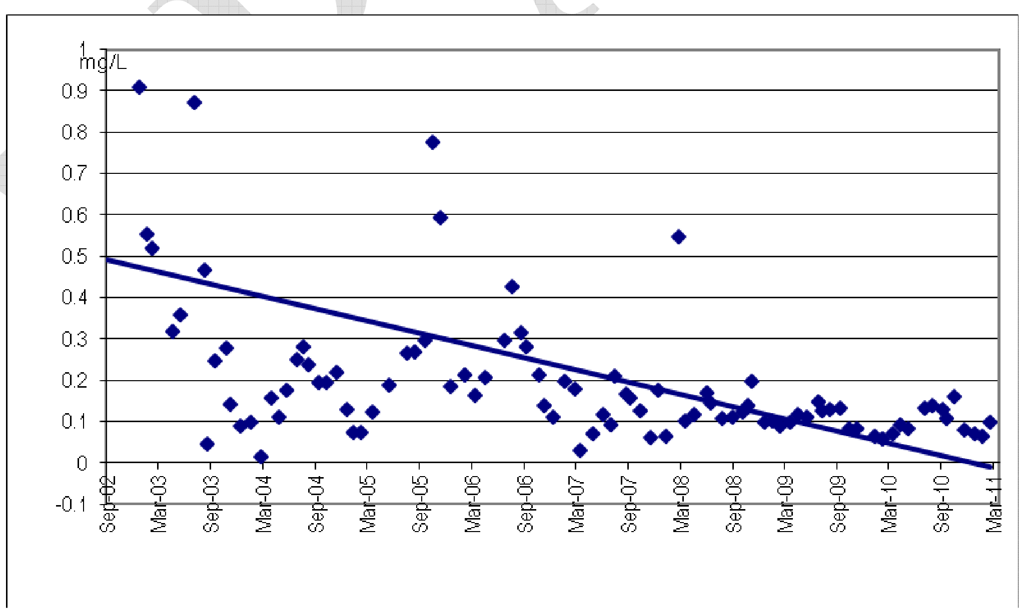
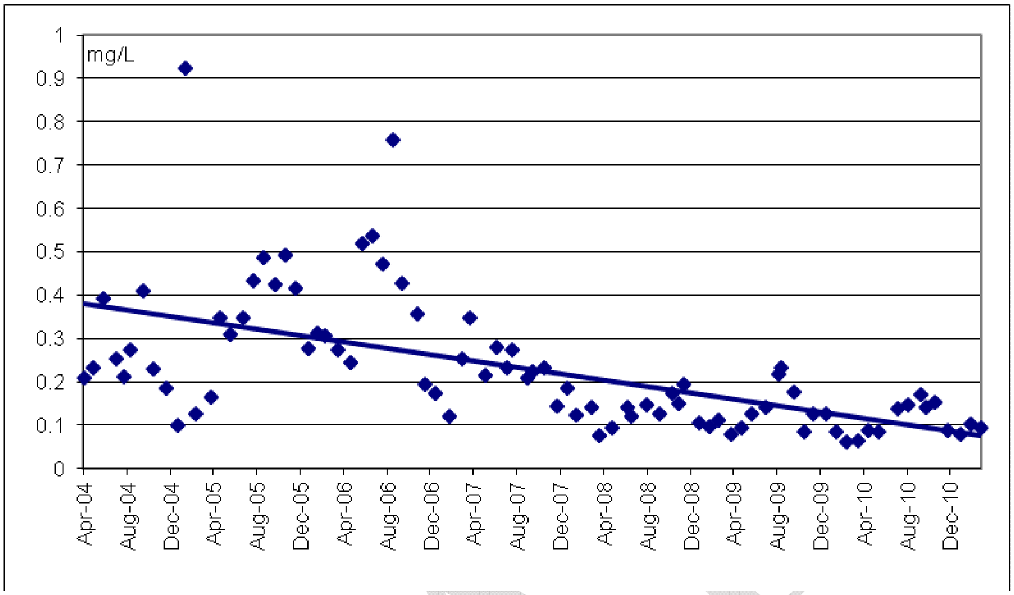


Figure A-31: Little Sugar Creek (ARK0056) Total Phosphorus trend since 2004



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 drains portions of Arkansas, Prairie, Woodruff, St. Francis, Lee, and Desha 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.

A segment of Big Creek was listed as not meeting the chloride and total dissolved solids water quality standards. The source is suspected to be from row crop agriculture activities.

Prairie Cypress Creek and Boat Gunwale Slash were both listed because of low dissolved oxygen concentrations. This is a naturally occurring condition throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated. This issue will need to be addressed either through a standards change or an assessment methodology change.

Figure A-32: Planning Segment 4A

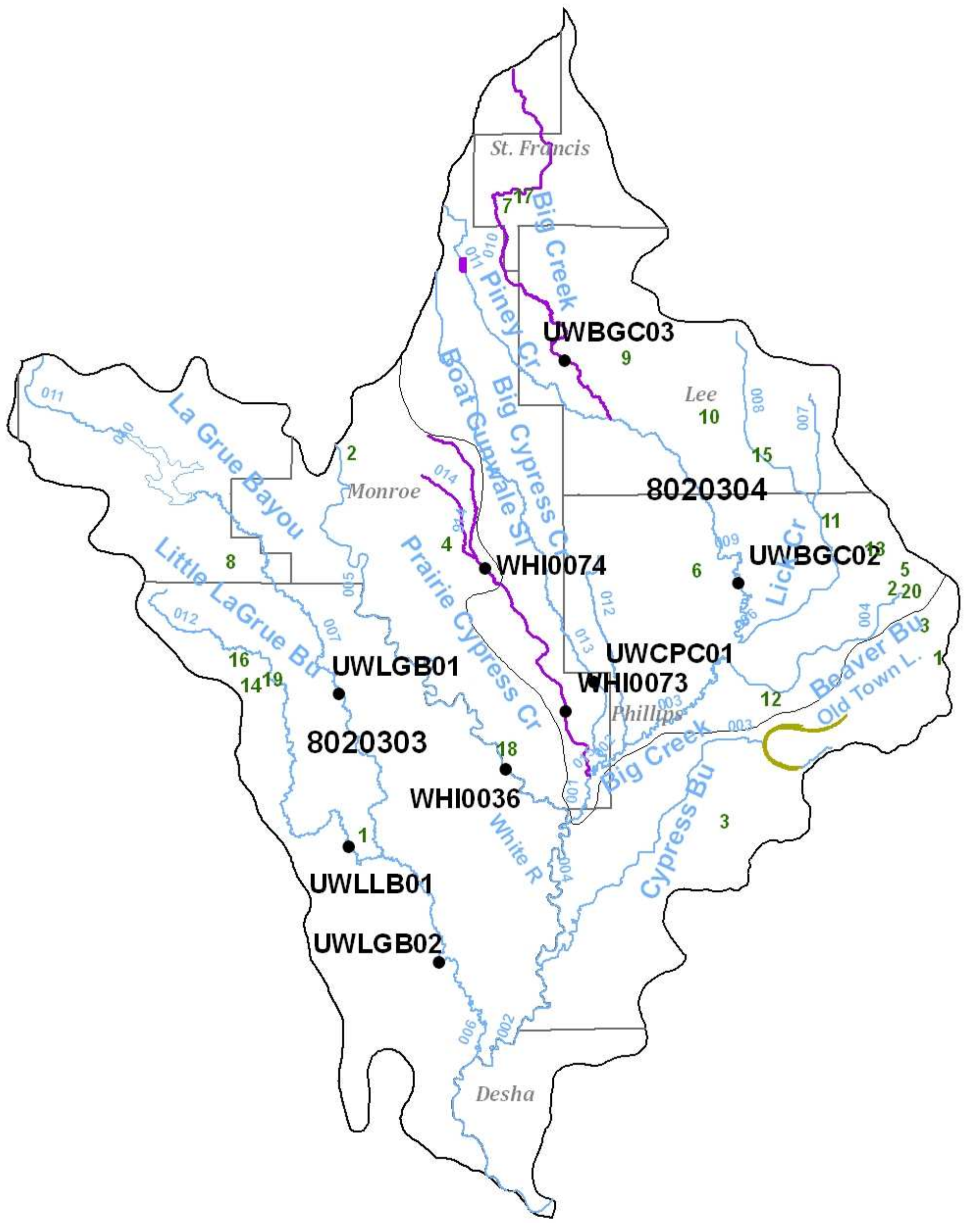


Table A-43: Planning Segment 4A—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4
SEG-4A																							
White River	8020303	-001	16.2		E	S	S	S	S	S	S									1			
White River	8020303	-002	11.3		E	S	S	S	S	S	S									1			
Cypress Bayou	8020303	-003	30.0		U															3			
White River	8020303	-004	14.8		E	S	S	S	S	S	S									1			
White River	8020303	-005	46.6	WHI0036	M	S	S	S	S	S	S									1			
La Grue Bayou	8020303	-006	20.1	UWLGB02	M	S	S	S	S	S	S									1			
La Grue Bayou	8020303	-007	36.1	UWLGB01	M	S	S	S	S	S	S									1			
La Grue Bayou	8020303	-011	11.7		U															3			
L.La Grue Bayou	8020303	-012	37.0	UWLLB01	M	S	S	S	S	S	S									1			
Big Creek	8020304	-001	4.1		E	S	S	S	S	S	S									1			
Big Creek	8020304	-002	2.7		E	S	S	S	S	S	S									1			
Big Creek	8020304	-003	12.4	WHI0037	M	S	S	S	S	S	S									1			
Beaver Bayou	8020304	-004	17.4		E	S	S	S	S	S	S									1			
Big Creek	8020304	-005	1.7		E	S	S	S	S	S	S									1			
Lick Creek	8020304	-006	15.5		E	S	S	S	S	S	S									1			
Lick Creek	8020304	-007	6.8		E	S	S	S	S	S	S									1			
Big Cypress Cr.	8020304	-008	14.9		E	S	S	S	S	S	S									1			
Big Creek	8020304	-009	25.2	UWBGC02	M	S	S	S	S	S	S									1			
Big Creek	8020304	-010	34.3	UWBGC03	M	S	S	S	S	S	S	AG				Cl	TDS			5			
Piney Creek	8020304	-011	14.9		E	S	S	S	S	S	S									1			
Little Cypress	8020304	-012	19.3		U															3			
Big Cypress Cr.	8020304	-013	40.8	UWCPC01	M	S	S	S	S	S	S									1			
Prairie Cypress	8020304	-014	26.1	WHI0073	M	S	S	S	S	S	S	UN				DO				5			
Big Creek	8020304	-015	1.2		U															1			
Boat Gunwale Slash	8020304	-914	5.0	WHI0074	M	S	S	S	S	S	S	UN				DO				5			

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	403.9	0
FISHERIES	403.9	0
PRIMARY CONTACT	403.9	0
SECONDARY CONTACT	403.9	0
DRINKING SUPPLY	403.9	0
AGRI & INDUSTRY	403.9	0

TOTAL MILES	466.1
MILES UNASSESSED	62.2
MILES EVALUATED	120.3
MILES MONITORED	283.6

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0036	White River at Highway 1 near St. Charles	Y	1	A
UWLGB02	LaGrue Bayou at Highway 17 at LaGrue Springs		2	R
UWLGB01	LaGrue Bayou at Highway 33 near LaGrue		2	R
UWLLB01	Little LaGrue Bayou at Highway 1 near Dewitt		2	R
WHI0037	Big Creek at Highway 318 near Watkins Corner		2	R
UWBGC02	Big Creek at Highway 49 near Poplar Bluff		2	R
UWBGC03	Big Creek at Highway 79, 3 miles west of Moro		2	R
UWCPC01	Big Cypress Creek at Highway 1, 4 miles northeast of Cross Roads		2	R
WHI0073	Prairie Cypress Creek at Highway 1 near Cross Roads		1	A
WHI0074	Boat Gunwale Slash at Highway 146 near Holly Grove		1	A

Table A-44: Segment 4A Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0021431	DEWITT WATER WORKS	CONF/BIG & LTL LAGRUE BU,WHITE RV	012	8020303	Arkansas	1
AR0021644	CLARENDON, CITY OF	WHITE RV	005	8020303	Monroe	2
AR0022420	ELAINE, CITY OF	GOVAN SLU,GAUZLEY BU,CYPRESS BU	003	8020303	Phillips	3
AR0022438	HOLLY GROVE, CITY OF	DIAL CR,CUT BLUFF SLU,WHITE RV	005	8020303	Monroe	4
AR0022756	HELENA INDUSTRIES, INC.	DIT,CROOKED CR,LICK CR,BIG CR,WHITE RV	004	8020304	Phillips	5
AR0035840	MARVELL, CITY OF	BIG CR,WHITE RV	009	8020304	Phillips	6
AR0036315	WHEATLEY, CITY OF	FLAT FORK CR,BIG CR,WHITE RV	010	8020304	St. Francis	7
AR0038008	ULM, CITY OF	TRIB,SHERRIL CR,LAGRUE BU	007	8020303	Prairie	8
AR0038237	MORO, CITY OF	HOG TUSK CR,BIG CR,WHITE RV	010	8020304	Lee	9
AR0038784	AUBREY, CITY OF	TRIB,CAT CR,SPRING CR,WHITE RV	009	8020304	Lee	10
AR0041092	LEXA, CITY OF	LICK CR,BIG CR,WHITE RV	006	8020304	Phillips	11
AR0041327	LAKE VIEW, CITY OF	JOHNSON BU,BIG CR,WHITE RIVER	003	8020304	Phillips	12
AR0042404	SOUTHLAND IMPROVEMENT DISTRICT	CROOKED CR LICK CR,BIG CR,WHITE RV	006	8020304	Phillips	13
AR0044415	U of A RICE RESEARCH & EXTENSION	DITCH, LTL LAGRUE BU,WHITE RIVER	012	8020303	Arkansas	14
AR0045373	RONDO, CITY OF	TRIB,BIG CYPRESS CR,LICK CR,BIG CR,WHITE RV	008	8020304	Lee	15
AR0046469	MONSANTO AG RESEARCH	WILDCAT DIT TRIB,LT LAGRUE BU	012	8020303	Arkansas	16
AR0046752	MAPCO EXPRESS, INC-3154 WHEATL	TRIB,FLAT FORK CR,FLAT FORK,LTL RV	010	8020304	St. Francis	17
AR0049310	ST CHARLES, CITY OF	WHITE RV	005	8020303	Arkansas	18
AR0049352	USDA-AQUACULTURE RESEARCH CENT	UNNAMED DITCH,LTL LAGRUE BU, WHITE RIVER	012	8020303	Arkansas	19
AR0051276	DELTA LUMBER, LLC	TRIB,CANEY CR,BEAVER BU DIT,BIG CR,WHITE RV	004	8020304	Phillips	20

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.

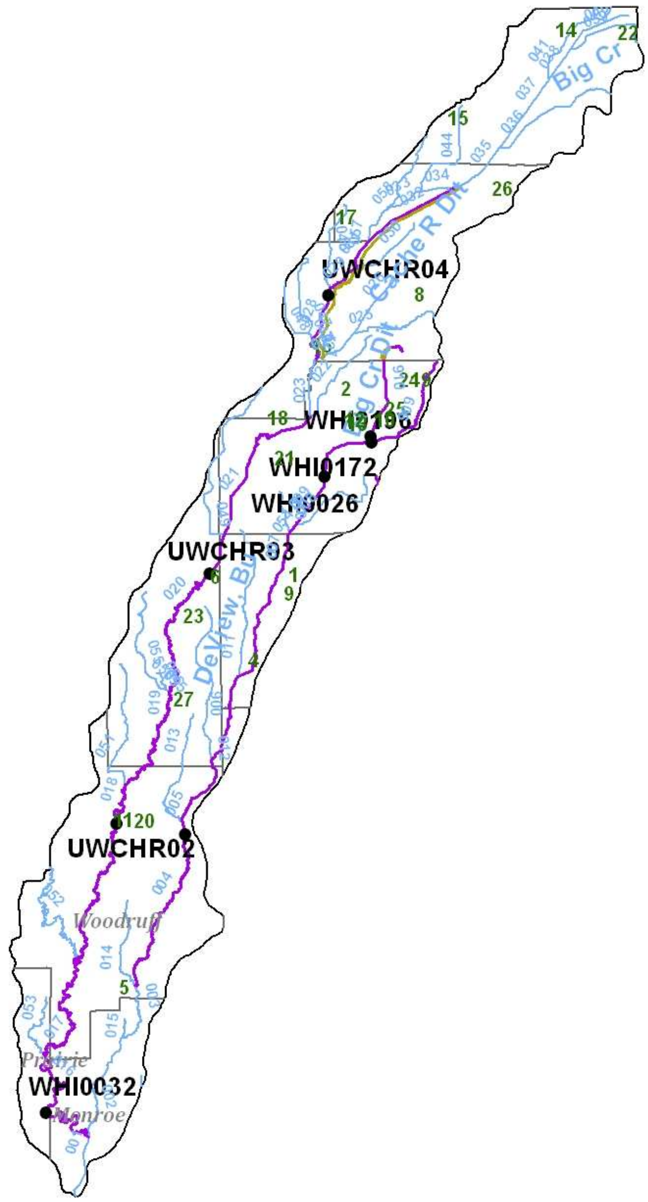
Summary of Water Quality Conditions

Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies.

The upper section of Bayou DeView and Lost Creek Ditch are not meeting the fisheries designated use because of elevated levels of chlorides and total dissolved solids. Potential sources include point source discharges and row crop agriculture activities.

Several segments of the Cache River and Bayou DeView have been listed because of lead contamination. It is possible elevated metals detections are associated with the large winter and spring storm events that carry large amounts of clay particles into the water bodies. Additional investigation is needed to more accurately assess this problem.

Figure A-33: Planning Segment 4B



(Segment 4B)

Permitted Facilities
● Monitoring Stations
Category 4a Waterbodies
Category 5 Waterbodies

Table A-45: Planning Segment 4B—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	SOURCE 1	SOURCE 2	SOURCE 3	SOURCE 4	CAUSE 1	CAUSE 2	CAUSE 3	CAUSE 4	STATUS 1	STATUS 2	STATUS 3	STATUS 4
SEG-4B																							
Cache River	8020302	-001	8.6		E	S	S	S	S	S	S									1			
Bayou DeView	8020302	-002	13.7	WHI0033	M	S	S	S	S	S	S									1			
Bayou DeView	8020302	-003	7.1		E	S	S	S	S	S	S									1			
Bayou DeView	8020302	-004	21.2	UWBDV02	M	S	N	S	S	S	S	AG				Pb				5			
Bayou DeView	8020302	-005	8.6		E	S	N	S	S	S	S	AG				Pb				5			
Bayou DeView	8020302	-006	10.2		E	S	N	S	S	S	S	AG				Pb				5			
Bayou DeView	8020302	-007	18.2		E	S	N	S	S	S	S	AG				Pb				5			
Big Creek Ditch	8020302	-910	13.0	WHI0196	M	S	N	S	S	S	S	UN				Cu				5			
Lost Creek Ditch	8020302	-909	7.9	WHI0172	M	S	N	S	S	S	S	IP	MP			CL				5			
Bayou DeView	8020302	-009	11.7	WHI0026	M	S	S	S	S	S	S	IP	MP			Cu				5			
Black Creek	8020302	-008	13.0		U															3			
Johnson Ditch	8020302	-010	6.5		U															3			
Flag Slough	8020302	-011	14.7		U															3			
Cow Ditch	8020302	-012	19.2		U															3			
May Br. Lateral	8020302	-013	12.6		U															3			
Buffalo Creek	8020302	-014	13.1		U															3			
Gum Flat	8020302	-015	8.8		U															3			
Cache River	8020302	-016	21.8	WHI0032	M	S	N	S	S	S	S	AG				Pb				5			
Cache River	8020302	-017	15.8		E	S	N	S	S	S	S	AG				Pb				5			
Cache River	8020302	-018	25.0	UWCHR02	M	S	N	S	S	S	S	AG				Pb				5			
Cache River	8020302	-019	13.7		E	S	N	S	S	S	S	AG				Pb				5			
Cache River	8020302	-020	22.6	UWCHR03	M	S	N	S	S	S	S	AG				Pb				5			
Cache River	8020302	-021	18.4		E	S	N	S	S	S	S	AG				Pb				5			
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	N	AG	AG			TDS	Tb	Pb		5	4a	5	
Cache River	8020302	-028	5.9	UWCHR04	M	S	N	S	S	S	N	AG	AG			TDS	Tb	Pb		5	4a	5	
Cache River	8020302	-029	3.9		E	S	N	S	S	S	N	AG	AG			TDS	Tb	Pb		5	4a	5	
Swan Ditch	8020302	-030	9.1		U															3			
Cache River	8020302	-031	3.4		E	S	N	S	S	S	N	AG	AG			TDS	Tb	Pb		5	4a	5	
Cache River	8020302	-032	11.4		E	S	N	S	S	S	N	AG	AG			TDS	Tb	Pb		5	4a	5	
Cache River	8020302	-033	4.3		U															3			
Cache River	8020302	-034	3.7		U															3			
Cache River	8020302	-035	4.6		U															3			
Big Creek	8020302	-036	16.2		U															3			
Cache River	8020302	-037	12.3		U															3			
Little Cache	8020302	-038	4.4		U															3			
Housman Creek	8020302	-039	6.7		U															3			
Little Cache	8020302	-040	8.1		U															3			
Cache River	8020302	-041	8.7		U															3			
Big Gum Lateral	8020302	-044	11.2		U															3			
Beaver Dam Cr.	8020302	-045	11.8		U															3			
Kello Ditch	8020302	-046	0.6		U															3			
Kello Ditch	8020302	-047	8.5		U															3			
Fry Ditch	8020302	-048	8.0		U															3			
Willow Ditch	8020302	-049	17.6		U															3			
Locust Creek	8020302	-050	18.8		U															3			
Overcup Creek	8020302	-051	15.7		U															3			
Cache Bayou	8020302	-052	18.7		U															3			
Hill Bayou	8020302	-053	8.1		U															3			
Locust Bayou	8020302	-055	0.4		U															3			
Cypress Creek	8020302	-056	6.5		U															3			
Cache River	8020302	-057	4.7		U															3			
Petersburg Ditch	8020302	-058	9.7		U															3			
TOTAL MILES	612.1																						
MILES UNASSESSED	346.1																						
MILES EVALUATED	123.2																						
MILES MONITORED	142.8																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	266	0
FISHERIES	41.1	224.9
PRIMARY CONTACT	266	0
SECONDARY CONTACT	266	0
DRINKING SUPPLY	266	0
AGRI & INDUSTRY	237.5	28.5

Table A-45(cont.): Planning Segment 4B—Designated Use Attainment Status and Water Quality Monitoring Stations

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0033	Bayou DeView at Highway 70 near Brinkley		2	R
UWBDV02	Bayou DeView at Highway 64 east of McCrory		2	R
WHI0172	Lost Creek Ditch at Lacy Drive near Jonesboro		1	A
WHI0026	Bayou DeView on Highway 226 west of Gibson	Y	1	A
WHI0032	Cache River at Highway 70 near Brinkley		2	R
UWCHR02	Cache River at Highway 64 at Peterson		2	R
UWCHR03	Cache River at Highway 18 near Gruggs		2	R
UWCHR04	Cache River at Highway 412 east of Walnut Ridge		2	R

Table A-46: Segment 4B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0020354	WEINER, CITY OF	TRIB, BUDEVIEW, CACHE RV, WHITE RV	007	8020302	Poinsett	1
AR0020699	BONO, CITY OF	TRIB/WHALEY SLU DIT, EAST CACHE RV, WHITE RIVER	021	8020302	Craighead	2
AR0021890	BRINKLEY, CITY OF	CANEY SLASH,TRIB,BIG CYPRESS CR,BIG CR,WHITE RV	013	8020302	Monroe	3
AR0022446	FISHER, CITY OF	BUDEVIEW TRIB,BUDEVIEW,WHITE RV	007	8020302	Poinsett	4
AR0033391	COTTON PLANT, CITY OF	TURKEY CR DIT,BUDEVIEW,CACHE RV	002	8020302	Woodruff	5
AR0034614	GRUBBS, CITY OF	CACHE RV,WHITE RV	020	8020302	Jackson	6
AR0034720	HICKORY RIDGE, CITY OF	BUDEVIEW,CACHE RV,WHITE RV	006	8020302	Cross	7
AR0035947	ARK PARKS CROWLEY'S RIDGE	DIT,BIG DIT,CACHE,WHITE RV	026	8020302	Greene	8
AR0037834	RICELAND FOODS, INC-WALDENBURG	TRIB,BUDEVIEW,CACHE RV,WHITE RV	007	8020302	Poinsett	9
AR0037907	JONESBORO, CWL WESTSIDE WWTP	UNNAMED TRIB,BIG CR,BUDEVIEW,CACHE RIVER	909	8020302	Craighead	10
AR0039837	PATTERSON, CITY OF	CACHE RIVER, WHITE RIVER	018	8020302	Woodruff	11
AR0041629	WESTSIDE SCHOOL DISTRICT #5	TRIB,BIG CR DIT,BUDEVIEW,CACHE RV	009	8020302	Craighead	12
AR0042188	NORTHERN MOBILE HOME PARK	TRIB,BIG CR,BUDEVIEW,CACHE RV,WHITE RV	009	8020302	Craighead	13
AR0042781	MCDOUGAL, CITY OF	CACHE R DIT #1,OLD CACHE R DIT #1,CACHE R,WHITE R	041	8020302	Clay	14
AR0043290	KNOBEL, CITY OF	TRIB,CACHE RV,WHITE RV	044	8020302	Clay	15
AR0043443	SEDGWICK, CITY OF	W CACHE RV DIT,CACHE RV,WHITE RV	027	8020302	Lawrence	16
AR0043486	TRI-CITY UTILITIES, INC	TRIB,BEAVER DAM DIT,CACHE R,WHITE RV	045	8020302	Randolph	17
AR0043524	EGYPT, CITY OF	W CACHE RV DIT,CACHE RV,WHITE RV	021	8020302	Craighead	18
AR0044211	OLIVETAN BENEDICTINE SISTERS	TRIB,LOST CR,BIG CR DIT	909	8020302	Craighead	19
AR0044954	MCCRORY, CITY OF	CACHE RV,WHITE RV	018	8020302	Woodruff	20
AR0045284	CASH, CITY OF	TRIB,CACHE RV,WHITE RV	021	8020302	Craighead	21
AR0045489	POLLARD SEWER SYSTEM	HORSE CR,DIT#2,DIT#1,CACHE RV,WHITE	039	8020302	Clay	22
AR0046604	AMAGON, CITY OF	TRIB,CACHE RV,WHITE RV	020	8020302	Jackson	23
AR0046981	HEDGER AGGREGATE, INC.	UNNAMED TRIB,MUD CR,BIG CR DIT,BYU DEVIEW,CACHE RV	909	8020302	Craighead	24
AR0048402	LMJ TRAILER PARK	TRIB,BIG CREEK DIT,BUDEVIEW,CACHE	909	8020302	Craighead	25
AR0048909	LAFE, CITY OF	BIG CR, CACHE RV, WHITE RV	036	8020302	Greene	26
AR0049603	BEEDEVILLE, CITY OF	CACHE RV,WHITE RV,ARKANSAS RV	019	8020302	Jackson	27

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SEGMENT 4C VILLAGE CREEK AND TRIBUTARIES

Segment 4C includes portions of Randolph, Green, Lawrence, Jackson, Woodruff, and White Counties. This segment contains Village Creek and its tributaries, sections of the White River and its tributaries, 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.

Three reaches of Village Creek were listed because of low dissolved oxygen concentrations. This is a naturally occurring condition throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated.

One segment of Departee Creek and one segment of Glaise Creek were listed as not supporting the fisheries designated use because of elevated levels zinc. It is possible elevated metals detections are associated with the large winter and spring storm events that carry large amounts of clay particles into the water bodies. Additional investigation is needed to more accurately assess this problem.

Figure A-34: Planning Segment 4C

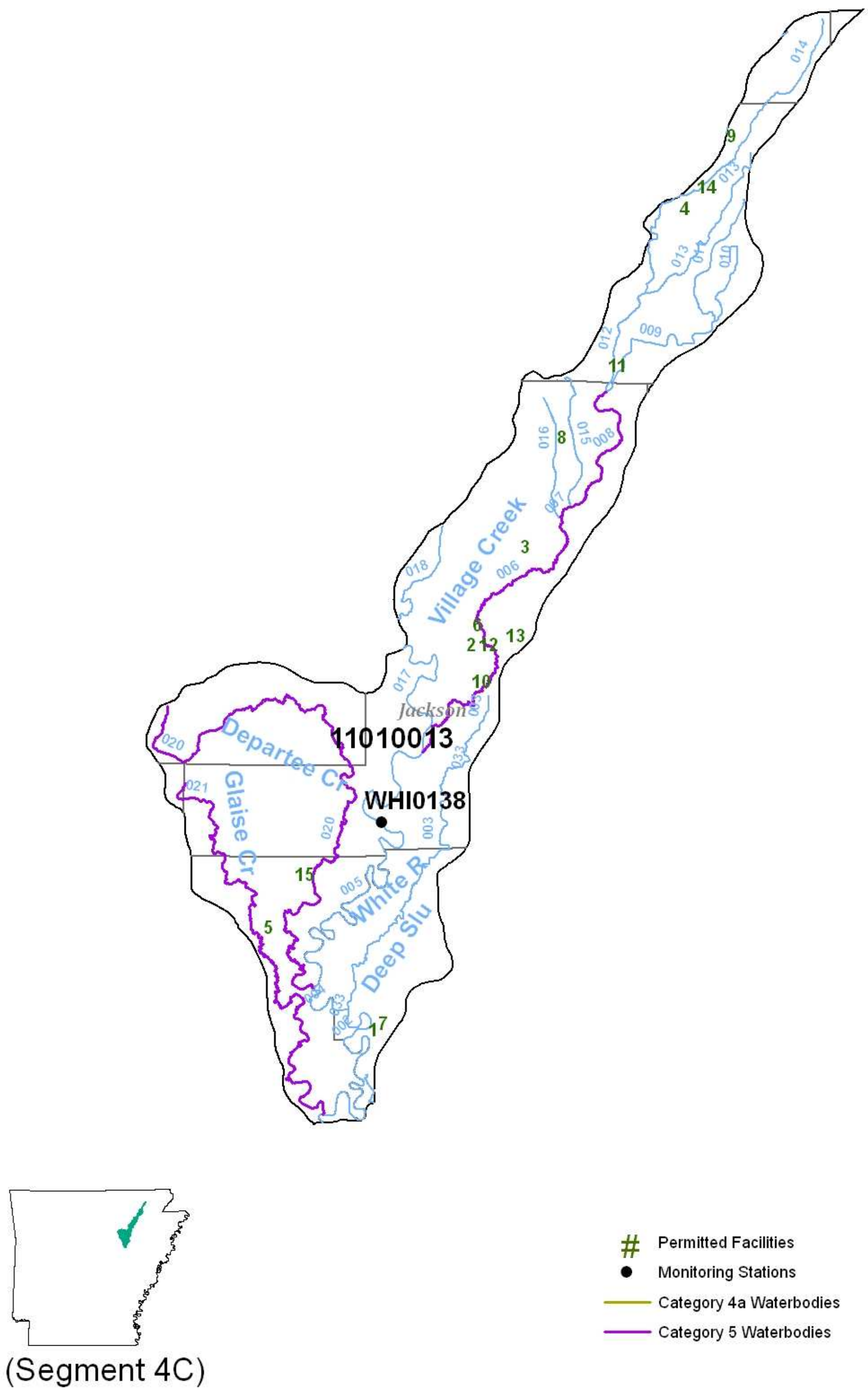


Table A-47: Planning Segment 4C—Designated Use Attainment Status and Water Quality Monitoring Stations

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
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				FISHERIES	132.3	76.2
Deep Slough	11010013	-003	12.7		U															3				PRIMARY CONTACT	208.5	0
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	WHI0138	M	S	S	S	S	S	S									1				DRINKING SUPPLY	208.5	0
Village Cr	11010013	-006	25.2	UWVGC01,3	M	S	S	S	S	S	S	UN				DO				5				AGRI & INDUSTRY	208.5	0
Village Cr	11010013	-007	1.2		E	S	S	S	S	S	S	UN				DO				5						
Village Cr	11010013	-008	13.0		E	S	S	S	S	S	S	UN				DO				5						
Lick Pond Slough	11010013	-009	10.9		U															3						
Lick Pond Slough	11010013	-011	10.4		U															3						
Village Cr	11010013	-012	7.4	UWVGC02	M	S	S	S	S	S	S									1						
Village Cr	11010013	-014	22.8		E	S	S	S	S	S	S									1						
Maple Ditch	11010013	-015	9.5		U															3						
Cattail Cr	11010013	-016	9.3		U															3						
White River	11010013	-017	13.7		U															3						
Jack Creek	11010013	-018	9.6		U															3						
White River	11010013	-019	0.4		U															3						
Departee Creek	11010013	-020	46.1	UWDTC01	M	S	N	S	S	S	S	AG				Zn				5						
Glaise Creek	11010013	-021	30.1	UWGSC01	M	S	N	S	S	S	S	AG				Zn				5						
TOTAL MILES	285.0																									
MILES UNASSESSED	76.5																									
MILES EVALUATED	63.0																									
MILES MONITORED	145.5																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0138	White River at Highway 67 near Newport	Y	1	A
UWVGC01	Village Creek at Highway 37 near Tuckerman		2	R
UWVGC03	Village Creek at Highway 24 near Newport		2	R
UWVGC02	Village Creek at Highway 228 near Miniturn		2	R
UWDTC01	Departee Creek east of Bradford		2	R
UWGSG01	Glaise Creek at Highway 64 east of Bald Knob		2	R

Table A-48: Segment 4C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0000400	ARKANSAS ELECTRIC COOP-CARLE	WHITE RV (001) & OLD CANEY CR (002)	002	11010013	Woodruff	1
AR0001481	NORANDAL USA, INC	DITCH,VILLAGE CR,WHITE RIVER	006	11010013	Jackson	2
AR0020001	TUCKERMAN, CITY OF	TUCKERMAN DITCH CR,VILLAGE CR,WHITE RV	006	11010013	Jackson	3
AR0020141	HOXIE, CITY OF	TRIB,TURKEY CR,VILLAGE CR	014	11010013	Lawrence	4
AR0022217	RUSSELL, CITY OF	UNNAMED TRIB/GLAISE CR,WHITE RV	021	11010013	White	5
AR0034550	ARKANSAS STEEL ASSOC	TRIB,VILLAGE CR,WHITE RV	006	11010013	Jackson	6
AR0034738	AUGUSTA, CITY OF	WHITE RIVER	002	11010013	Woodruff	7
AR0034860	SWIFTON, CITY OF	CATTAIL CR,VILLAGE CR,WHITE RV	016	11010013	Jackson	8
AR0036668	FRIT INDUSTRIES, INC	TRIB,COON CR,VILLAGE CR,WHITE R	014	11010013	Lawrence	9
AR0037044	NEWPORT, CITY OF-WASTEWATER TR	DIT,VILLAGE CR,WHITE RV	006	11010013	Jackson	10
AR0039675	ALICIA, CITY OF	BLACKSPICE DIT,VILLAGE CR, WHITE	008	11010013	Lawrence	11
AR0041033	DIAZ, CITY OF	TRIB,VILLAGE CR,WHITE RV	006	11010013	Jackson	12
AR0045225	NEWPORT, CITY OF-AIRPORT/INDUS	TRIB,LOCUST CR,VILLAGE CR,WHITE RV	014	11010013	Jackson	13
AR0046566	WALNUT RIDGE, CITY OF-WWTP	VILLAGE CR,WHITE RV	014	11010013	Lawrence	14
AR0050911	BRADFORD, CITY OF	BUTTER CR,DEPARTEE CR,WHITE RV,AR RV	020	11010013	White	15

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

Segment 4D includes portions of White, Prairie, Faulkner, Pulaski, Lonoke, and Monroe Counties in central Arkansas. The segment encompasses a 67-mile stretch of the White River, and its tributaries, Wattensaw and Des Arc Bayous.

Summary of Water Quality Conditions

Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies.

Two stream reaches on Bayou Des Arc and one reach each on Bull Bayou and Cypress Bayou were listed as not supporting the fisheries designated use because of metals toxicity. It is thought that most of the elevated metals detections are associated with the large winter and spring storm events that carry large amounts of clay particles into the Bayous. Additional investigation is needed to more accurately assess this problem.

Wattensaw Bayou was listed because of low dissolved oxygen concentrations. This is a naturally occurring condition throughout the Delta ecoregion during the critical season when flows are diminished and water temperatures are elevated. This issue will need to be addressed either through a standards change or an assessment methodology change.

Figure A-35: Planning Segment 4D

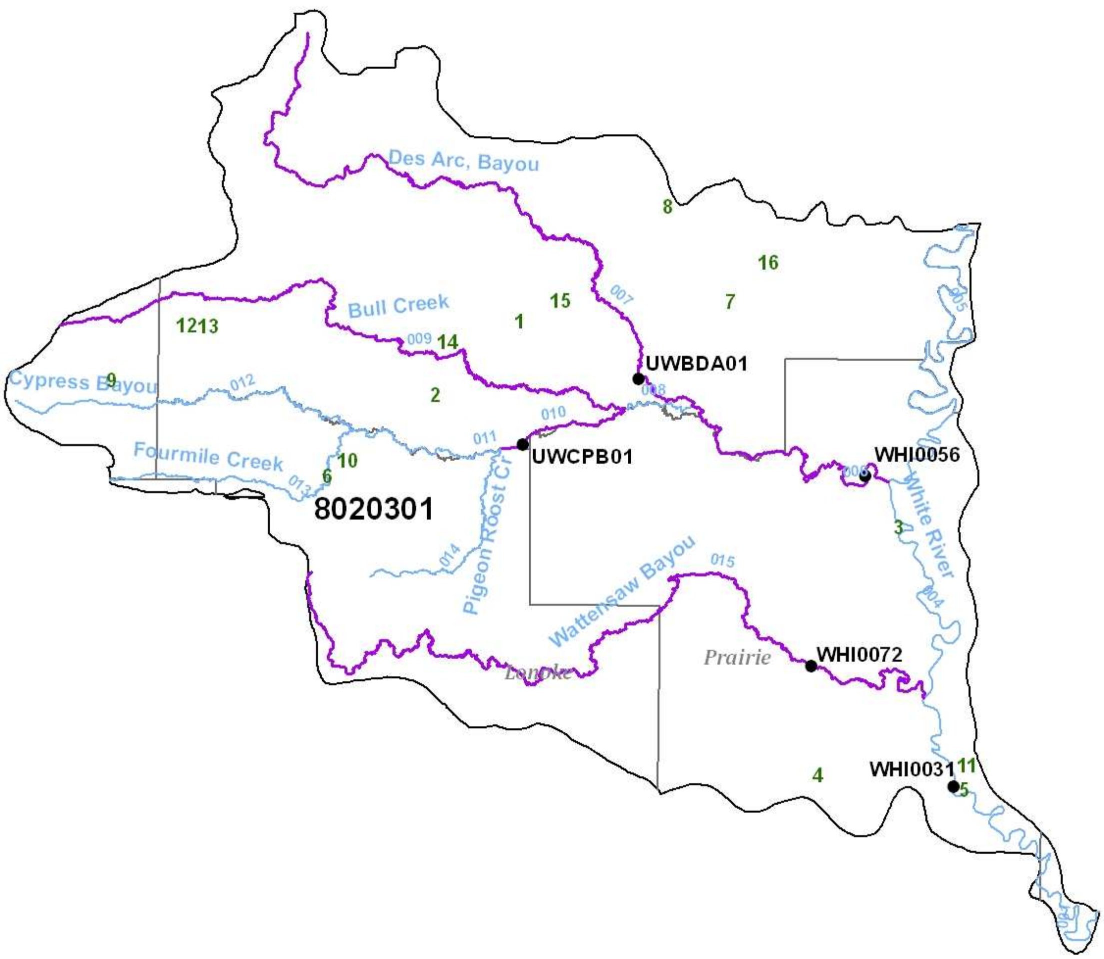


Table A-49: Planning Segment 4D—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4
SEG-4D																							
White River	8020301	-001	24.3	WHI0031	M	S	S	S	S	S	S									1			
White River	8020301	-004	14.8		E	S	S	S	S	S	S									1			
White River	8020301	-005	28.2		E	S	S	S	S	S	S									1			
Bayou Des Arc	8020301	-006	17.8	WHI0056	M	S	N	S	S	S	S	AG				Zn				5			
Bayou Des Arc	8020301	-007	36.4	UWBDA01	M	S	N	S	S	S	S	AG				Zn				5			
Cypress Bayou	8020301	-008	3.2		U															3			
Bull Bayou	8020301	-009	29.0	UWBLB01	M	S	N	S	S	S	S	AG				Zn				5			
Cypress Bayou	8020301	-010	5.0	UWCPB01	M	S	N	S	S	S	S	AG				Pb				5			
Cypress Bayou	8020301	-011	9.5		U															3			
Cypress Bayou	8020301	-012	17.5		U															3			
Fourmile Creek	8020301	-013	12.8		U															3			
Pigeon Roost	8020301	-014	11.0		U															3			
Wattensaw Bayou	8020301	-015	48.2	WHI0072	M	S	S	S	S	S	S	UN				DO				5			
TOTAL MILES	257.7																						
MILES UNASSESSED	54.0																						
MILES EVALUATED	43.0																						
MILES MONITORED	160.7																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	203.7	0
FISHERIES	115.5	88.2
PRIMARY CONTACT	203.7	0
SECONDARY CONTACT	203.7	0
DRINKING SUPPLY	203.7	0
AGRI & INDUSTRY	203.7	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0031	White River at DeValls Bluff	Y	1	A
WHI0056	Bayou Des Arc at Highway 11 near Walker		2	R
UWBDA01	Bayou Des Arc at county road above Cypress Creek		2	R
UWBLB01	Bull Bayou at Highway 367 near Beebe		2	R
UWCPB01	Cypress Creek at Highway 13 southeast of Beebe		2	R
WHI0072	Wattensaw Bayou north of Hazen	Y	1	A

Table A-50: Segment 4D Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0021504	MCRAE, CITY OF	DRY BRANCH CR,CANE CR,BU DES ARC	006	8020301	White	1
AR0022101	BEEBE, CITY OF-WWTP	CYPRESS BU,BU DES ARC,WHITE RV	011	8020301	White	2
AR0022225	DES ARC, CITY OF	WHITE RV	004	8020301	Prairie	3
AR0022411	HAZEN, CITY OF	LTL HURRICANE CR,WATTENSAW BU-CR,WHITE	015	8020301	Prairie	4
AR0035611	DEVALLS BLUFF, CITY OF	DIT,WHITE RV	001	8020301	Prairie	5
AR0038369	AUSTIN, CITY OF	4-MILE CR,MGNESS CR,CYPRESS BU, B DES ARC,WHITE RV	006	8020301	Lonoke	6
AR0042803	GRIFFITHVILLE, CITY OF	TRB,DOGWOOD CK,BU DES ARC,WHITE RV	006	8020301	White	7
AR0044822	HIGGINSON, CITY OF	GUM SPRINGS CR,GLADE CR,BU DES ARC	012	8020301	White	8
AR0047121	VILONIA, CITY OF	CYPRESS BU,BU DES ARC,WHITE RV	013	8020301	Faulkner	9
AR0047554	WARD, CITY OF	4-MILE CR,CYPRESS BU,DES ARC BU,WHITE R	012	8020301	Lonoke	10
AR0047589	BISCOE, CITY OF	WHITE RV	001	8020303	Prairie	11
AR0049301	NEW NEPTUNE, LLC D/B/A MAX MART 1026	TRIB,LTL CYPRESS CR,CYPRESS BU,BU DES ARC, WHITE RV	012	8020301	White	12
AR0050156	MAD JACK'S #2, LLC	TRIB,LTL CYPRESS CR,CYPRESS BU,...	012	8020301	White	13
AR0051390	J.C. WARNER, INC.	BULL CR, CYPRESS BU, BU DES ARC, WHITE RV	009	8020301	White	14
AR0051438	OILFIELD COMPLIANCE SOLUTIONS, LLC	TRIB ,CANE CR,BULLCR,CYPRESS BYU,BYU DES ARC	009	8020301	White	15
AR0051527	OILFIELD COMPLIANCE SOLUTIONS, LLC	TRIB, WHITE OAK CR, BU DES ARC, WHITE RV	006	8020301	White	16

SEGMENT 4E LITTLE RED RIVER: HEADWATERS TO MOUTH

Segment 4E includes portions of Searcy, Pope, Van Buren, Stone, Cleburne, White, and Independence Counties. The segment contains the entire 81 mile length of the Little Red River and its tributaries: Middle, South, North, Archey, and Devil's Forks, and Big Creek.

Summary of Water Quality Conditions

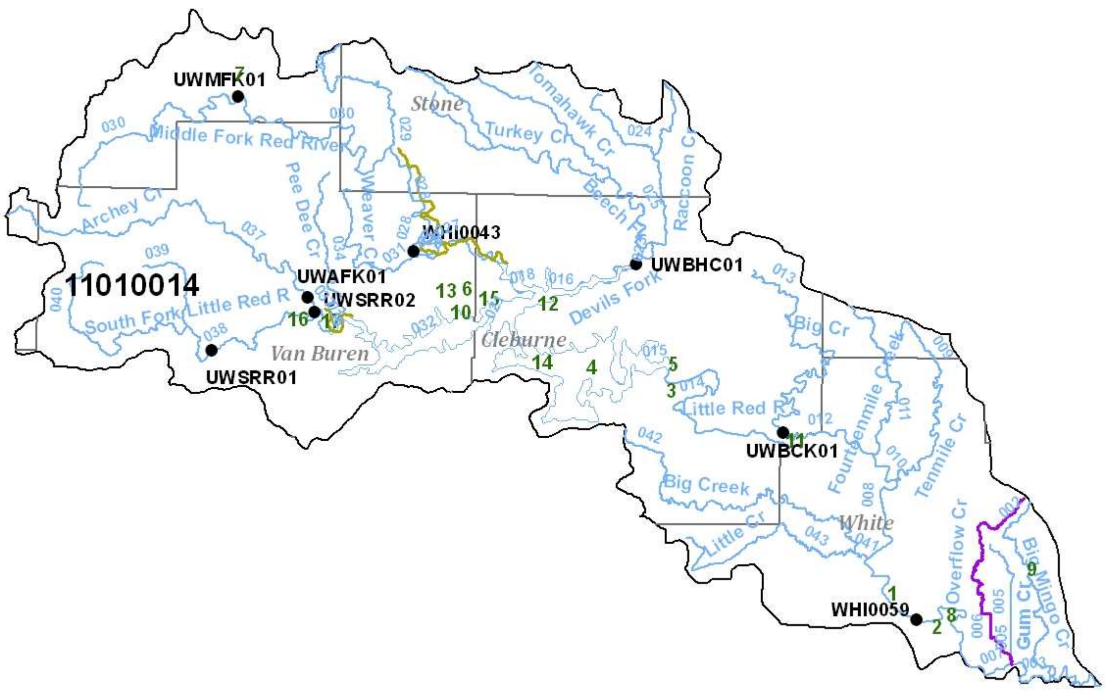
Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies. Additionally, 158.1 miles, approximately one-third of the stream miles, are designated as outstanding state or national resource waters.

Approximately two miles of the South Fork of the Little Red River at the upper end of Greers Ferry Reservoir was found to have mercury contamination of certain predator fishes and was placed under a fish consumption advisory.

The Middle Fork Little Red River near Shirley is currently assessed as not attaining the primary contact recreation use because of pathogen contamination.

Two segments of Overflow Creek were listed as not supporting the Fisheries Designated use because of zinc toxicity. It is thought that most of the elevated metals detections are associated with the large winter and spring storm events that carry large amounts of clay particles into the creek. Additional investigation is needed to more accurately assess this problem.

Figure A-36: Planning Segment 4E



Permitted Facilities
● Monitoring Stations
Category 4a Waterbodies
Category 5 Waterbodies

Table A-51: Planning Segment 4E—Designated Use Attainment Status and Water Quality Monitoring Stations

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-4E																										
Little Red R.	11010014	-001	7.5		U															3				FISH CONSUMPTION	276.9	2
Big Mingo Cr.	11010014	-002	14.4		U															3				FISHERIES	248.2	21.7
Little Red R.	11010014	-003	5.4		U															3				PRIMARY CONTACT	249.1	0
Overflow Creek	11010014	-004	0.6		E	S	S	S	S	S	S	AG				Zn				5				SECONDARY CONTACT	269.9	0
Unnamed	11010014	-005	9.5		U															3				DRINKING SUPPLY	269.9	0
Overflow Cr.	11010014	-006	21.7	UWOFC01	M	S	N	S	S	S	S	AG				Zn				5				AGRI & INDUSTRY	269.9	0
Little Red R.	11010014	-007	21.4	WHI0059	M	S	S	S	S	S	S									1						
Little Red R.	11010014	-008	9.0		U	S														3						
Ten Mile Creek	11010014	-009	18.6	UWTMC01	M	S	S	S	S	S	S									1						
Little Red R.	11010014	-010	2.9		U															3						
Fourteen Mile	11010014	-011	13.9		U															3						
Little Red R.	11010014	-012	8.0		U															3						
Big Creek	11010014	-013	26.9	UWBCK01	M	S	S	S	S	S	S									1						
Little Red R.	11010014	-014	22.0		U															3						
Devils Fork	11010014	-023	2.9		U															3						
Raccoon Creek	11010014	-024	15.7		U															3						
Beech Creek	11010014	-025	28.4		U															3						
Middle Fork	11010014	-027	8.8	WHI0043	M	S	S	x	S	S	S									1						
Middle Fork	11010014	-028	12.0		E	S	S	x	S	S	S									1						
Middle Fork	11010014	-030	44.2	UWMFK01	M	S	S	S	S	S	S									1						
Meadow Creek	11010014	-029	10.3	WHI0153	M	S	S	S	S	S	S									1						
Sugar Cane Cr.	11010014	-031	10.8		U															3						
Pee Dee Creek	11010014	-034	12.9		U															3						
Archey Creek	11010014	-037	27.3	UWAFK01	M	S	S	S	S	S	S									1						
South Fork	11010014	-036	2.0		E	N	S	S	S	S	S	UN				Hg				4a						
South Fork	11010014	-038	14.7	UWSRR01&2	M	S	S	S	S	S	S									1						
Opossum Walk	11010014	-039	7.0		U															1						
South Fork	11010014	-040	17.7		E	S	S	S	S	S	S									3						
Big Creek	11010014	-041	1.2		E	S	S	S	S	S	S									1						
Big Creek	11010014	-042	27.5	UWBCR01	M	S	S	S	S	S	S									1						
Little Creek	11010014	-043	15.0		E	S	S	S	S	S	S									1						
TOTAL MILES	440.2																									
MILES UNASSESSED	170.3																									
MILES EVALUATED	48.5																									
MILES MONITORED	221.4																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWOFC01	Overflow Creek 1.5 miles southeast of Judsonia		2	R
WHI0059	Little Red River at Highway 367 below Searcy		1	A
UWTMC01	Ten Mile Creek at Highway 157 north of Providence		2	R
UWBCK01	Big Creek off Highway 110 near Hiram		2	R
WHI0043	Middle Fork Little Red River at Highway 9 near Shirley	Y	1	A
UWMFK01	Middle Fork Little Red River at US 65 near Leslie		2	R
WHI0153	Meadow Creek at county road northeast of Old Lexington		2	R
UWAFK01	Archey Fork Little Red River at Highway 65 near Clinton		2	R
UWSRR01	South Fork Little Red River at Highway 95 near Scotland		2	R
UWSRR02	South Fork Little Red River at US 65 near Clinton		2	R
UWBCR01	Big Creek at Highway 16 neat Letona		2	R

Table A-52: Segment 4E Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0021601	SEARCY, CITY OF (WATER)	LTL RED RV,WHITE RV	007	11010014	White	1
AR0022322	KENSETT, CITY OF	BLACK CR,LTL RED R,WHITE RV	007	11010014	White	2
AR0022381	HEBER SPRINGS, CITY OF	LTL RED RV,WHITE RV	014	11010014	Cleburne	3
AR0024066	EDEN ISLE CORP	GREERS FERRY RSVR,LTL RED RV,WHITE RV	015	11010014	Cleburne	4
AR0029181	USDIFWS-GREERS FERRY NATL FISH	LTL RED RV	014	11010014	Cleburne	5
AR0034401	FAIRFIELD BAY COMM. CLUB, INC	DAVE CR,GREERS FERRY LK,WHITE RV	032	11010014	Van Buren	6
AR0034657	LESLIE, CITY OF	COVE CR, MID FORK LITTLE RED RV, GREERS FERRY LK	030	11010014	Searcy	7
AR0035742	JUDSONIA, CITY OF	LTL RED RV	007	11010014	White	8
AR0035807	BALD KNOB, CITY OF	BIG MINGO CR,LITTLE RED RIVER,WHITE RIVER	002	11010014	White	9
AR0037303	FAIRFIELD BAY WASTEWATER CORP - HAMILTON HILLS WWTP	TRIB,LYNN CR,GREERS FERRY LK	032	11010014	Van Buren	10
AR0039233	PANGBURN, CITY OF	LTL RED RV,WHITE RV	014	11010014	White	11
AR0043940	WEST SIDE SCHOOL DIST #4	TRIB,GREERS FERRY RSRV	015	11010014	Cleburne	12
AR0044580	FAIRFIELD BAY-LYNN CREEK WWTP	LYNN CR,GREERS FERRY LK,LITTLE RED RV,WHITE RV	032	11010014	Van Buren	13
AR0044920	DIAMOND BLUFF PROPERTY OWNERS IMPROVEMENT DIST 1	GREERS FERRY LK	015	11010014	Cleburne	14
AR0046078	FAIRFIELD BAY-COMM.CLUB,INC	HOOTN.HOL.CR,GREERS FRY LK,LTL RED	032	11010014	Cleburne	15
AR0048747	CLINTON, CITY OF-WEST WASTE WA	TRIB,S FK LTL RED R,GREERS FERRY LK, LTL RED R	038	11010014	Van Buren	16
AR0048836	CLINTON, CITY OF-EAST WWTF	TRIB,S FK LTL RED R,GREERS FERRY LK,LTL RED R.	036	11010014	Van Buren	17
AR0049859	LETONA SANITARY SEWER	TRB,BIG CR,LITTLE RED RIV,WHITE RIVER	042	11010014	Crittenden	18

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

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

Summary of Water Quality Conditions

Waters within this segment have been designated for fish and wildlife propagation, primary and secondary contact recreation, and domestic, agricultural, and industrial water supply uses.

The 9.1 miles of Hicks Creek did not meet the primary contact recreation use because of high pathogen concentrations. The source of the contaminant is thought to be from a municipal point source discharge.

The stream segment of the North Fork River below Lake Norfork was listed because of low dissolved oxygen concentrations. The source is from the hydropower facility located at the dam. A Total Maximum Daily Load was developed in 2009. In addition, changes in the operational plan, modifications to the turbines, and direct injection of oxygen into the receiving stream have all been implemented and funded by the hydropower facility to address this issue.

Figure A-37: Planning Segment 4F

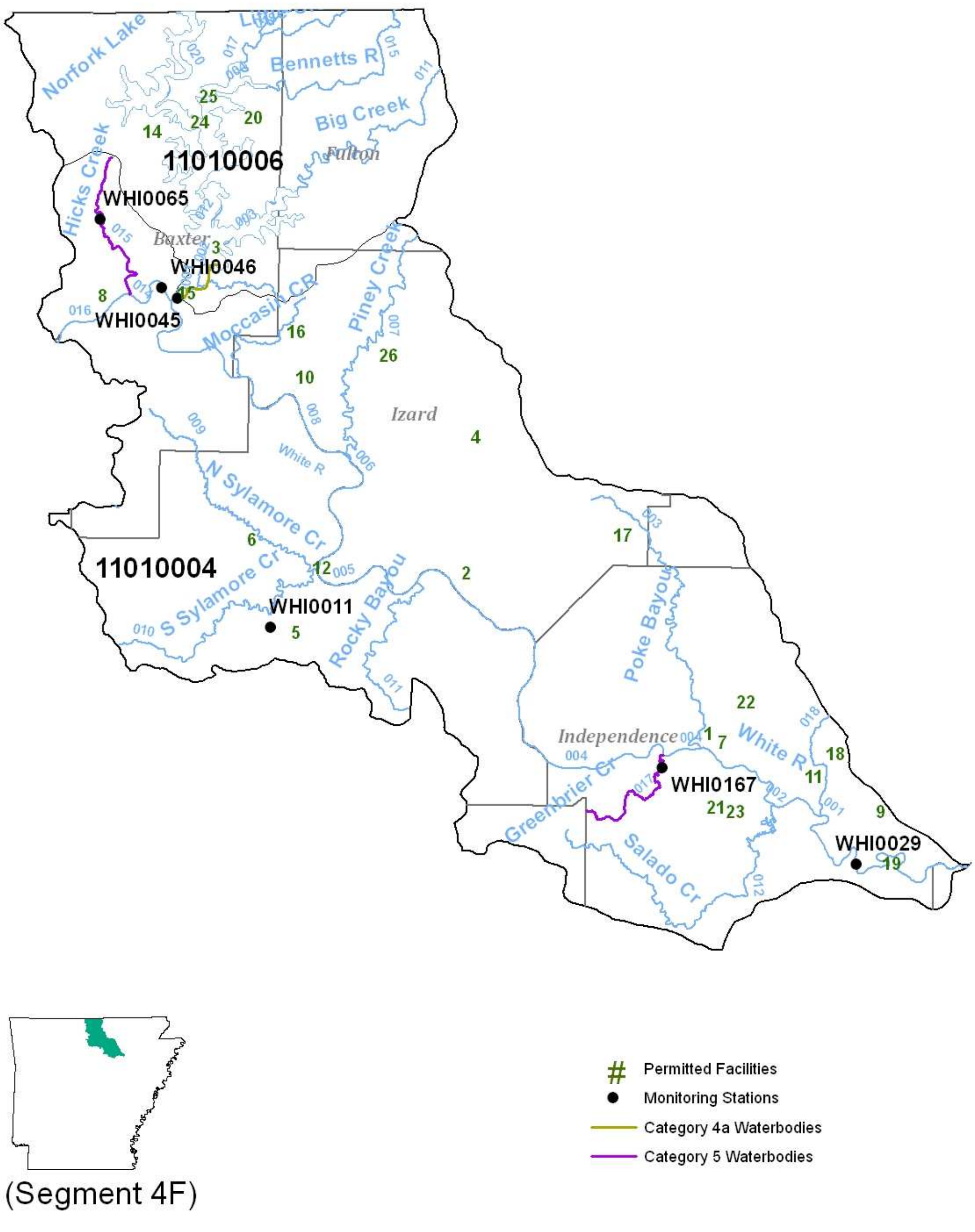


Table A-53: Planning Segment 4F—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4
SEG-4F																							
White River	11010004	-001	26.7	WHI0029	M	S	S	S	S	S	S									1			
White River	11010004	-002	8.2		E	S	S	S	S	S	S									1			
Poke Bayou	11010004	-003	23.4	WHI0169	M	S	S	S	S	S	S									1			
White River	11010004	-004	32.6		E	S	S	S	S	S	S									1			
White River	11010004	-005	9.6		E	S	S	S	S	S	S									1			
White River	11010004	-006	12.5		E	S	S	S	S	S	S									1			
White River	11010004	-008	23.6		E	S	S	S	S	S	S									1			
Piney Creek	11010004	-007	19.7	WHI0168	M	S	S	S	S	S	S									1			
North Sylamore	11010004	-009	18.4		E	S	S	S	S	S	S									1			
South Sylamore	11010004	-010	16.0	WHI0011	M	S	S	S	S	S	S									1			
Rocky Bayou	11010004	-011	13.5		E	S	S	S	S	S	S									1			
Salado Creek	11010004	-012	27.4	WHI0166	M	S	S	S	S	S	S									1			
North Sylamore	11010004	-013	0.7		E	S	S	S	S	S	S									1			
White River	11010004	-014	4.7	WHI0046	M	S	S	S	S	S	S									1			
Hicks Creek	11010004	-015	9.1	WHI0065	M	S	S	N	S	S	S	MP				PA				4a			
White River	11010004	-016	6.8		E	S	S	S	S	S	S									1			
Greenbrier Creek	11010004	-017	10.6	WHI0167	M	S	N	N	S	S	S	UN	UN			DO	PA			5	5		
Big Creek	11010004	-018	9.4	WHI0164	M	S	S	S	S	S	S									1			
North Fork River	11010006	-001	4.2	WHI0045	M	S	S	S	S	S	S	HP				DO				4a			
Big Creek	11010006	-011	18.4		U															3			
Bennetts River	11010006	-015	15.3		U															3			
Bennetts River	11010006	-017	3.0		U															3			
Bennetts River	11010006	-019	12.7		U															3			
Little Creek	11010006	-018	7.8		U															3			
TOTAL MILES	334.3																						
MILES UNASSESSED	57.2																						
MILES EVALUATED	125.9																						
MILES MONITORED	151.2																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	277.1	0.0
FISHERIES	266.5	10.6
PRIMARY CONTACT	257.4	19.7
SECONDARY CONTACT	277.1	0.0
DRINKING SUPPLY	277.1	0.0
AGRI & INDUSTRY	277.1	0.0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0029	White River at Oil Trough	Y	1	A
WHI0169	Poke Bayou near Batesville		2	R
WHI0168	Piney Creek on county road near Boswell		2	R
WHI0011	South Sylamore Creek below Lick Fork Creek		1	A
WHI0166	Salado Creek at Highway 14 near Salado		2	R
WHI0046	White River near Norfork		1	A
WHI0065	Hicks Creek below Mountain Home		1	A
WHI0167	Greenbrier Creek at Highway 25 near Batesville		2	R
WHI0164	Big Creek at Highway 394 near Magness		2	R
WHI0045	North Fork White River near Norfork		1	A

Table A-54: Segment 4F Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0001589	GALLOWAY SAND & GRAVEL	POKE BU, WHITE RV	002	11010004	Independence	1
AR0001899	UNIMIN CORPORATION-GUION FACILITY	ROCKY BU (1) & BACKWATER SLU (9)	004	11010004	Izard	2
AR0002437	U.S. FWS - NORFORK NATL FISH HATCHERY	DRY RUN CR,N FORK RV,WHITE RV	002	11010006	Baxter	3
AR0020036	MELBOURNE, CITY OF	MILL CR,PINEY CR,WHITE R	007	11010004	Izard	4
AR0020117	MOUNTAIN VIEW, CITY OF	HUGHES CR,LICK FK CR,SYLAMORE CR,WHITE RV	005	11010004	Stone	5
AR0020664	USDAFS-BLANCHARD SPRINGS REC	N SYLAMORE CR,WHITE RV	009	11010004	Stone	6
AR0020702	BATESVILLE, CITY OF-WWTP	WHITE R	002	11010004	Independence	7
AR0021211	MOUNTAIN HOME, CITY OF-WWTP	HICRS CR,BIG CR,WHITE RV	015	11010004	Baxter	8
AR0021229	NEWARK, CITY OF	WHITE RV	001	11010004	Independence	9
AR0034606	CALICO ROCK, CITY OF	CALICO CR, WHITE RV	008	11010004	Izard	10
AR0035386	FUTUREFUEL CHEMICAL COMPANY	DIT,WHITE RV	001	11010004	Independence	11
AR0036081	HOLIDAY MOUNTAIN RESORT	TRIB,SYLAMORE CR,WHITE RV	009	11010004	Stone	12
AR0037451	ENTERGY SERVCES, INC. - INDEPENDENCE	WHITE RV	001	11010004	Independence	13
AR0042226	ROLLING MEADOWS MOBILE HOME	TRIB,PANTHER CR,NORFORK LK	012	11010004	Baxter	14
AR0043036	NORFORK, CITY OF	TOWN CR,WHITE RV	008	11010004	Baxter	15
AR0044016	AR DEPT OF CORRECTION-NCU-IZARD COUNTY FACILITY	UNNAMED TRIB,MOCCASIN CR,WHITE RV	008	11010004	Izard	16
AR0045357	MOUNT PLEASANT HOUSING AUTHORI	BARREN FORK CR,POLK BU,WHITE RV	003	11010004	Izard	17
AR0046680	SULPHUR ROCK, CITY OF	BIG CR,WHITE RV BASIN	018	11010004	Independence	18
AR0047597	OIL TROUGH, CITY OF	WHITE RV	001	11010004	Independence	19
AR0048798	HENDERSON CAR WASH AND LAUNDROMAT	TRIB, LK NORFORK	012	11010006	Baxter	20
AR0048992	AR HWY DEPT-DISTRICT 5 HQ	DOUBLE BR,CANEY CR,SALADO CR	012	11010004	Independence	21
AR0049069	CUSHMAN SAWMILL INC	TRIB PFEIFER CR,PFEIFER CR,MILLER CR,POKE BAYOU	002	11010004	Independence	22
AR0050784	SOUTHSIDE PUBLIC WATER/WTP	CANEY CR,SALADO CR,WHITE RV	012	11010004	Independence	23
AR0051209	ROYAL VIEW PROPERTIES, LLC	UNNAMED TRIB LK NORFORK, NORTH FORK RV, WHITE RV	012	11010006	Baxter	24
AR0051225	LAKE NORFORK QUICK STOP	TRIB, TO NORFORK LK, NORFORK LK, N FORK RV, WHITE	020	11010006	Baxter	25
AR0051748	EVERGREEN PROCESSING, LLC - D/B/A TWIN MTN QUARRY	UNNAMED TRIB, PINEY CR, WHITE RIVER	007	11010004	Izard	26

SEGMENT 4G BLACK RIVER, STRAWBERRY RIVER, AND TRIBUTARIES

Segment 4G includes portions of Fulton, Izard, Sharp, Independence, Jackson, Lawrence, Randolph, Clay, and Greene 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 tributaries; the Strawberry River and Current River.

Summary of Water Quality Conditions

Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies. Additionally, 112.2 miles of these streams are designated as outstanding state or national resource waters.

Almost 40 miles of Extraordinary Resource Waters in this segment were assessed as not supporting the Fisheries Designated use due to excessive turbidity levels. The total suspended solids and total phosphorus levels show peaking values much above normal. This is most likely from agriculture activities probably associated with pasturing and animal grazing to the edge of the stream bank. A TMDL was developed in 2006 addressing the silt issue.

Figure A-38: Planning Segment 4G

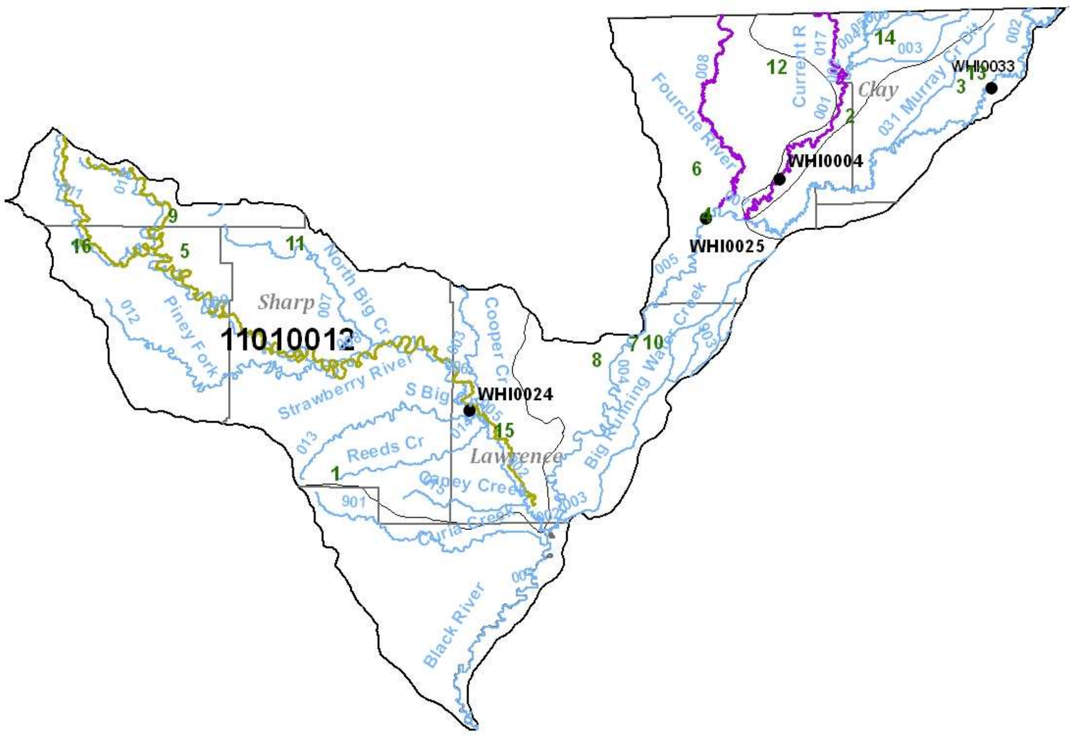


Table A-55: Planning Segment 4G—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use						SOURCE				CAUSE				STATUS				USE	SUPPORT	NON-SUPPORT
						FC	FSH	PC	SC	DW	AI	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	WHI0003	M	S	S	S	S	S	S									1				FISHERIES	313.1	127.6
Murray Creek	11010007	-031	15.2		U															3				PRIMARY CONTACT	440.7	0
Current River	11010008	-001	23.6	WHI0004	M	S	S	S	S	S	S	SE				Tb				5				SECONDARY CONTACT	440.7	0
Current River	11010008	-017	12.0		E	S	S	S	S	S	S	SE				Tb				5				DRINKING SUPPLY	440.7	0
Little Black	11010008	-002	2.5		U															3				AGRI & INDUSTRY	440.7	0
Byrnes Ditch	11010008	-003	16.2		U															3						
Little Black	11010008	-004	3.7		U															3						
Indian Creek	11010008	-005	4.1		U															3						
Black River	11010009	-001	25.8	UWBKR02	M	S	S	S	S	S	S									1						
Black River	11010009	-002	1.2		E	S	S	S	S	S	S									1						
Black River	11010009	-004	27.4	UWBKR01	M	S	S	S	S	S	S									1						
Black River	11010009	-005	17.5	WHI0025	M	S	S	S	S	S	S									1						
Black River	11010009	-007	3.8		U															3						
Big Running C.	11010009	-003	36.0		U															3						
Fourche River	11010009	-008	25.0	WHI0170	M	S	N	S	S	S	S	SE				Tb				5						
Strawberry R.	11010012	-001	4.4		E	S	S	S	S	S	S									1						
Strawberry R.	11010012	-002	9.4	UWSBR03	M	S	N	S	S	S	S	SE				Tb				4a						
Coopers Creek	11010012	-003	11.8	WHI0143S	M	S	S	S	S	S	S									1						
Strawberry R.	11010012	-004	0.3		E	S	N	S	S	S	S	SE				Tb				4a						
Strawberry R.	11010012	-005	0.7		E	S	N	S	S	S	S	SE				Tb				4a						
Strawberry R.	11010012	-006	19.0	WHI0024	M	S	N	S	S	S	S	SE				Tb				4a						
N. Big Creek	11010012	-007	20.8	UWNBC01	M	S	S	S	S	S	S									1						
Strawberry R.	11010012	-008	8.4		E	S	N	S	S	S	S	SE				Tb				4a						
Strawberry R.	11010012	-009	28.4	UWSBR02	M	S	N	S	S	S	S	SE				Tb				4a						
L. Strawberry R.	11010012	-010	16.0	WHI0143H+	M	S	N	S	S	S	S	SE				Tb				4a						
Strawberry R.	11010012	-011	20.4	UWSBR01	M	S	N	S	S	S	S	SE				Tb				4a						
Piney Fork	11010012	-012	26.1	WHI0143L+	M	S	S	S	S	S	S									1						
S. Big Creek	11010012	-013	19.3	WHI0143J+	M	S	S	S	S	S	S									1						
Reeds Creek	11010012	-014	15.0	UWRDC01	M	S	S	S	S	S	S									1						
Mill Creek	11010012	-016	9.9	WHI0143N	M	S	S	S	S	S	S									1						
Caney Creek	11010012	-015	11.6	WHI0143Q&R	M	S	S	S	S	S	S									1						
Curia Creek	11010009	-901	18.0	UWCAC01	M	S	S	S	S	S	S									1						
Data Creek	11010009	-902	21.8	WHI0165	M	S	S	S	S	S	S									1						
TOTAL MILES	522.2																									
MILES UNASSESSED	81.5																									
MILES EVALUATED	51.2																									
MILES MONITORED	389.5																									

Table A-55 (cont.): Planning Segment 4G—Designated Use Attainment Status and Water Quality Monitoring Stations

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0003	Black River at Highway 63 east of Corning	Y	1	A
WHI0004	Current River near Pocahontas	Y	1	A
UWBKR02	Black River at Highway 37 east of Cord		2	R
UWBKR01	Black River east of Highway 361 north of Strawberry		2	R
WHI0025	Black River at Pocahontas	Y	1	A
WHI0170	Fourche Creek at Highway 166 north of Pocahontas		2	R
UWSBR03	Strawberry River at Highway 361 near Saffell		2	R
WHI0143S	Cooper Creek at county road east of Highway 115 south of Smithville		2	S
WHI0024	Strawberry River south of Smithville	Y	1	A
UWNBC01	North Big Creek off Highway 354 east of Center		2	R
UWSBR02	Strawberry River at Highway 167 at Evening Shade		2	R
WHI0143H+	Little Strawberry River at Highway 354 east of Wiseman		2	S
UWSBR01	Strawberry River off Highway 354 near Wiseman		2	R
WHI0143L+	Piney Fork Creek at county road west of Zion		2	S
WHI0143J+	South Big Creek at Highway 117 near Jesup		2	S
UWRDC01	Reeds Creek at Highway 117 north of Strawberry		2	R
WHI0143N	Mill Creek on Strawberry Road south of Sitka		2	S
WHI0143Q+	Caney Creek on county road 346 near Saffell		2	S
UWCAC01	Curia Creek at Highway 25 north of Dowdy		2	R
WHI0165	Data Creek on Highway 25 near Mt. Zion		2	S

Table A-56: Segment 4G Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0022110	CAVE CITY, CITY OF	CURIA CR,BLACK RV,WHITE RV	901	11010009	Independence	1
AR0022209	REYNO, CITY OF	MURRAY CR,GAR SLU,BLACK RV,WHITE RV	001	11010007	Randolph	2
AR0033979	CORNING, CITY OF	BLACK RV	002	11010007	Clay	3
AR0034835	POCAHONTAS, CITY OF	BLACK RV,WHITE RV	005	11010009	Randolph	4
AR0035254	HORSESHOE BEND, CITY OF	TRB,STRAWBERRY RV,BLACK RV,WHITE RV	009	11010012	Izard	5
AR0036820	MACLEAN-ESNA	TRIB,MANSKER CR TRIB,BLACK RV,WHITE RV	005	11010009	Randolph	6
AR0037508	BLACK ROCK, CITY OF	TRIB,BLACK RV,WHITE RV	004	11010009	Lawrence	7
AR0038199	AR PARKS & TOURISM - LK CHARLES STATE PARK	LK CHARLES, FLAT CR, BLACK RV, WHITE RV	004	11010009	Lawrence	8
AR0039608	HORSESHOE BEND, CITY OF-PARADI	TRB,HUBBLE BR,LTL STRWB R,STRWB RV,	010	11010012	Izard	9
AR0040355	PORTIA, CITY OF	BLACK RV,BLACK & SPRING RVS,WHITE RV	004	11010009	Lawrence	10
AR0041742	ASH FLAT, CITY OF	N BIG CR,STRWBERRY RV,BLACK RV,WHITE RV	007	11010012	Sharp	11
AR0043834	MAYNARD, CITY OF	LEMMONS CR,BIG CR,FOURCHE RV,BLACK	008	11010009	Randolph	12
AR0047911	J.W. BLACK LUMBER COMPANY	TRIB,CORNING LK,BLACK RV	031	11010007	Clay	13
AR0048071	SUCCESS, TOWN OF	TRIB,BYRNES DIT,LTL BLACK RV,...	003	11010008	Clay	14
AR0048488	WESTERN LAWRENCE CO WWT DIST	STRAWBERRY RV TRIB,STRAWBERRY RV	002	11010012	Lawrence	15
AR0049701	OXFORD, CITY OF	SANDY CR,STRAWBERRY RV, BLACK RV...	011	11010012	Izard	16
AR0050261	HIGHLAND, CITY OF	TRIB,WORTHINGTON CR, WHITE RIVER BASIN	007	11010012	Sharp	17

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

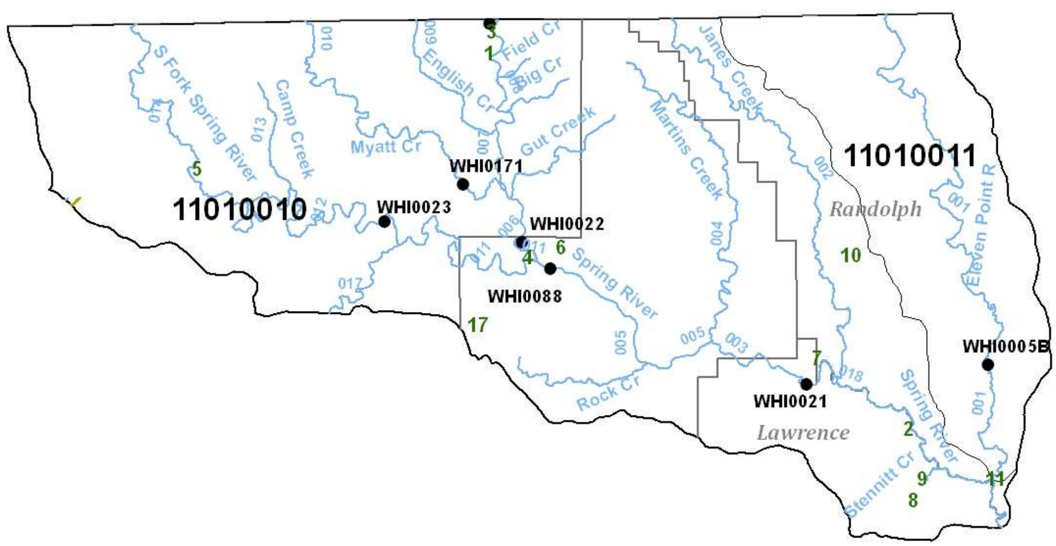
Segment 4H, in north central Arkansas, includes portions of Fulton, Sharp, and Randolph Counties. The segment encompasses the entire 46-mile length of the Spring River and its tributaries; the South Fork Spring River, the Eleven Point River, Myatt Creek, and Martin's Creek.

Summary of Water Quality Conditions

Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies. Additionally, about 74 percent of these waters are designated as outstanding state or national resource waters.

Two reaches of the Current River and one reach of the Fourche River were listed as not attaining the base flow turbidity water quality standard of 10 NTUs. This standard applies from June 1st to October 30th when instream flows are generally at their lowest and water quality conditions are least affected by storm water runoff. Rainfall the past five years has been above normal and has included an exceptionally high number of storm events and record runoffs during the normally low flow period.

Figure A-39: Planning Segment 4H



Permitted Facilities
Monitoring Stations
Category 4a Waterbodies
Category 5 Waterbodies

Table A-57: Planning Segment 4H—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-4H																				1						
Spring River	11010010	-001	3.3		E	S	S	S	S	S	S									1				FISH CONSUMPTION	238.1	0
Spring River	11010010	-018	12.0		E	S	S	S	S	S	S									1				FISHERIES	238.1	0
Janes Creek	11010010	-002	26.7	UWJNC01	M	S	S	S	S	S	S									1				PRIMARY CONTACT	238.1	0
Spring River	11010010	-003	9.4	WHI0021	M	S	S	S	S	S	S									1				SECONDARY CONTACT	238.1	0
Martins Creek	11010010	-004	19.0	UWMTC01	M	S	S	S	S	S	S									1				DRINKING SUPPLY	238.1	0
Spring River	11010010	-005	13.2	WHI0088	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	238.1	0
Spring River	11010010	-006	5.3	WHI0022	M	S	S	S	S	S	S									1						
Spring River	11010010	-007	4.0		E	S	S	S	S	S	S									1						
Warm Fork Spring R.	11010010	-008t	3.1	WHI006A	M	S	S	S	S	S	S									1						
Spring River	11010010	-008	8.8	WHI0089	M	S	S	S	S	S	S									1						
English Creek	11010010	-009	6.5		U	S	S	S	S	S	S									1						
Myatt Creek	11010010	-010	26.0	WHI0171	M	S	S	S	S	S	S									1						
S. Fork Spring	11010010	-011	13.4		E	S	S	S	S	S	S									1						
S. Fork Spring	11010010	-012	15.6	WHI0023	M	S	S	S	S	S	S									1						
S. Fork Spring	11010010	-014	24.0		E	S	S	S	S	S	S									1						
Camp Creek	11010010	-013	7.0		U	S	S	S	S	S	S									1						
Wild Horse C.	11010010	-017	7.7		U	S	S	S	S	S	S									1						
Eleven Point	11010011	-001	33.1	WHI0005B	M	S	S	S	S	S	S									1						
TOTAL MILES	238.1																									
MILES UNASSESSED	21.2																									
MILES EVALUATED	56.7																									
MILES MONITORED	160.2																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
UWJNC01	Janes Creek at Highway 90 near Ravenden Springs		2	R
WHI0021	Spring River south of Ravenden	Y	1	A
UWMTC01	Martins Creek at Highway 63 near Williford		2	R
WHI0088	White River at Town Bridge in Hardy		1	A
WHI0022	Spring River at low water crossing near Hardy	Y	1	A
WHI0006A	Warm Fork Spring River near Thayer, Mo	Y	1	A
WHI0089	Mammoth Spring east bridge at spillway		1	A
WHI0171	Myatt Creek at Bakers Ford road near Saddle		2	R
WHI0023	South Fork of Spring River near Saddle	Y	1	A
WHI0005B	Eleven Point River near Pocahontas	Y	1	A

Table A-58: Segment 4H Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0002879	AR GAME & FISH COMM-JIM HINKLE	SPRING RV	008	11010010	Fulton	1
AR0021628	IMBODEN, CITY OF	WAYLAND CR,SPRING R,BLACK R,WHITE RV	015	11010010	Lawrence	2
AR0023850	MAMMOTH SPRING, CITY OF	SPRING RV TRIB,SPRING RV	008	11010010	Fulton	3
AR0034282	CHEROKEE VILLAGE SEWER, INC	S FK SPRING RV, SPRING RV	011	11010010	Sharp	4
AR0034789	SALEM, CITY OF	S FK SPRING RV,BLACK RV,WHITE RV	014	11010010	Fulton	5
AR0037991	HARDY, CITY OF	SPRING RV,BLACK RV,WHITE RV	005	11010010	Sharp	6
AR0041254	RAVENDEN, CITY OF	TRIB,SPRING RV,BLACK RV	003	11010010	Lawrence	7
AR0046922	VULCAN CONSTR MATERIALS-BLACK ROCK QUARRY	TRIB,BRUSHY CR,STENNITT CR,SPRING R,BLACK RV	018	11010010	Lawrence	8
AR0047198	MARTIN MARIETTA MATERIALS-BLACK ROCK QUARRY	STENNITT CK,SPRING R,BLACK R,WHITE RV	018	11010010	Lawrence	9
AR0048712	RAVENDEN SPRINGS, TOWN OF	JOHNS CR TRIB,JOHNS CR,SPRING RV,BLACK RV	002	11010010	Randolph	10
AR0051616	NEA PUBLIC WATER AUTHORITY - WTP	SPRING RV, BLACK RV, WHITE RV	001	11010011	Randolph	11

SEGMENT 4I WHITE RIVER FROM CROOKED CREEK TO LONG CREEK

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

Summary of Water Quality Conditions

Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies. Bull Shoals Reservoir is designated as outstanding state or national resources.

Data from Crooked Creek above and below the City of Harrison sewage treatment plant demonstrate elevated parameters from this discharge and also reflects urban area runoff during storm events.

Figure A-40: Planning Segment 4I

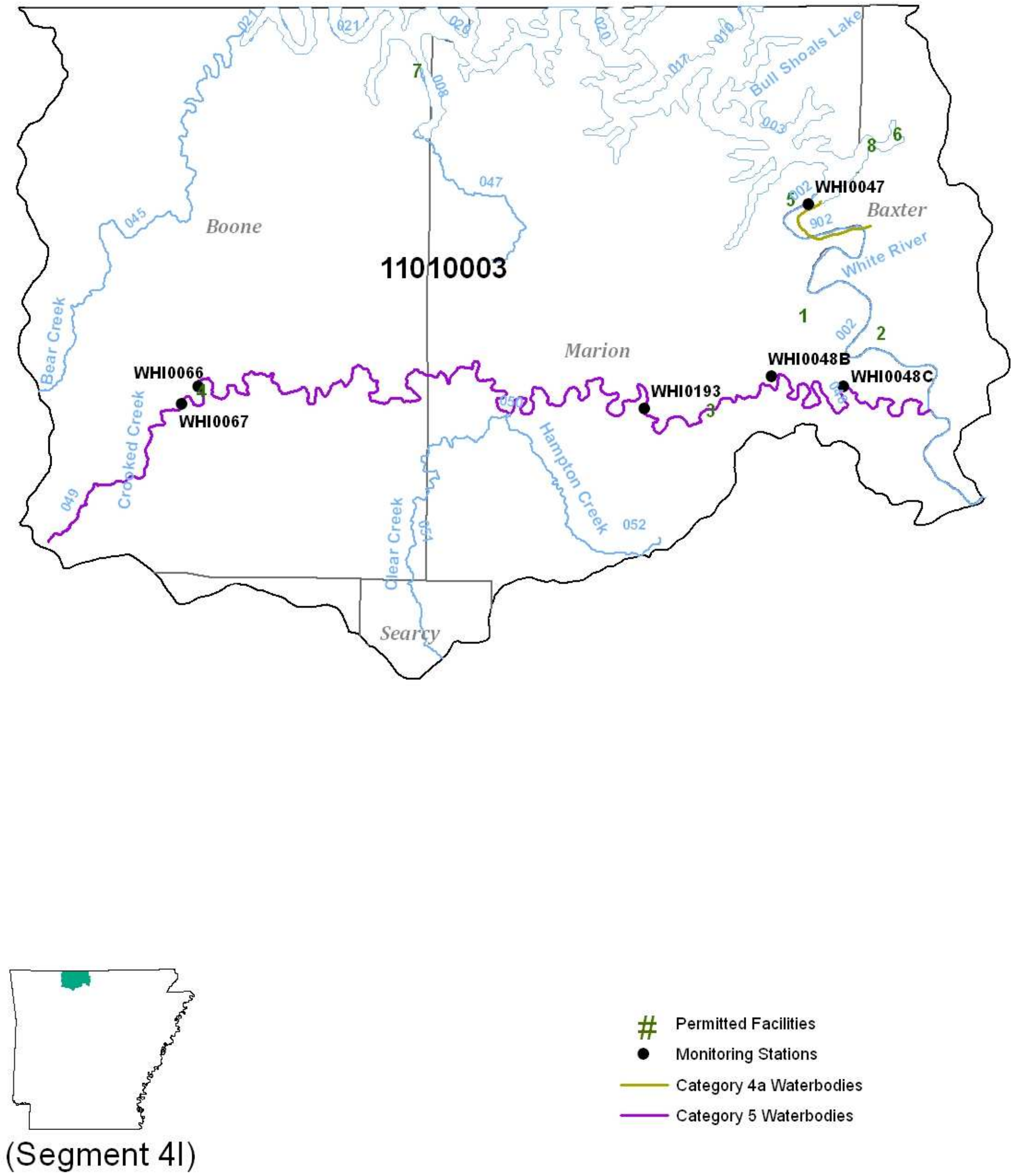


Table A-59: Planning Segment 4I—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-4I																										
White River	11010003	-001	7.6		E	S	N	S	S	S	S	HP				DO				4a				FISH CONSUMPTION	133.7	0
White River[1]	11010003	-902	3.0	USGS	M	S	N	S	S	S	S	HP				DO				4a				FISHERIES	86.9	46.8
White River[2]	11010003	-002	20.4	USGS	M	S	S	S	S	S	S									1				PRIMARY CONTACT	133.7	0
Bear Creek	11010003	-045	25.9	WHI0174	M	S	S	S	S	S	S									1				SECONDARY CONTACT	133.7	0
E. Horizon C.	11010003	-047	8.9		U	S	S	S	S	S	S									1				DRINKING SUPPLY	133.7	0
Crooked Creek	11010003	-048	31.7	WHI0148A+	M	S	S	S	S	S	S	UN				TDS				5				AGRI & INDUSTRY	133.7	0
Crooked Creek	11010003	-049	36.2	WHI0066+	M	S	N	S	S	S	S	UN				Cl	SO4	TDS		5	5	5				
Clear Creek	11010003	-050	0.4		U															3						
Clear Creek	11010003	-051	17.6		U															3						
Hampton Creek	11010003	-052	9.1		U															3						
TOTAL MILES	160.8																									
MILES UNASSESSED	36.0																									
MILES EVALUATED	7.6																									
MILES MONITORED	117.2																									

1 Reach formally -002U
2 Reach formally -002L

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0174	Bear Creek at Highway 14 east of New Hope		2	R
WHI0193	Crooked Creek at Highway 14 near Yellville	Y	1	A
WHI0148B	Crooked Creek south of Flippin		1	A
WHI0148C	Crooked Creek at Highway 101 near Rea Valley		1	A
WHI0066	Crooked Creek below Harrison		1	A
WHI0067	Crooked Creek above Harrison		1	A

Table A-60: Segment 4I Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0021717	FLIPPIN, CITY OF	FALLEN ASH CR,WHITE RV	002	11010003	Marion	1
AR0033545	COTTER-GASSVILLE WASTEWATER	TRIB, WHITE RV	002	11010003	Baxter	2
AR0034037	YELLVILLE, CITY OF	CROOKED CR,WHITE RV	048	11010003	Marion	3
AR0034321	HARRISON, CITY OF	CROOKED CR,WHITE RV	049	11010003	Boone	4
AR0037028	BULL SHOALS, CITY OF	WHITE RV	902	11010003	Marion	5
AR0037435	HOLIDAY SHORES RESORT	BULL SHOALS LK	003	11010003	Baxter	6
AR0043753	SUGARLOAF WWTF	E SUGAR LOAF CR,BULL SHOALS LK, WHITE RV	020	11010003	Boone	7
AR0050865	CEDAR OAKS HOMEOWNERS ASSOC.	BULL SHOALS LK,WHITE RV	004	11010003	Baxter	8

SEGMENT 4J BUFFALO RIVER AND TRIBUTARIES

Segment 4J includes portions of Newton, Searcy, and Marion Counties, and small portions of Boone, Pope, Baxter, Stone, and Van Buren Counties in north central Arkansas. This segment contains the entire 113-mile length of the Buffalo River and its tributaries; Big Creek, Little Buffalo River, Richland Creek, Water Creek, Bear Creek, and others.

Summary of Water Quality Conditions

Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies. Approximately 48 percent of the stream miles are designated as outstanding state or national resource waters. A cooperative project with the Buffalo National River added approximately 60 monitoring stations on the Buffalo River, its tributaries, and watershed springs.

Bear Creek below the city of Harrison is listed as not attaining the drinking water designated use because of elevated total dissolved solids. The source is thought to be from a municipal point source discharge.

Figure A-41: Planning Segment 4J

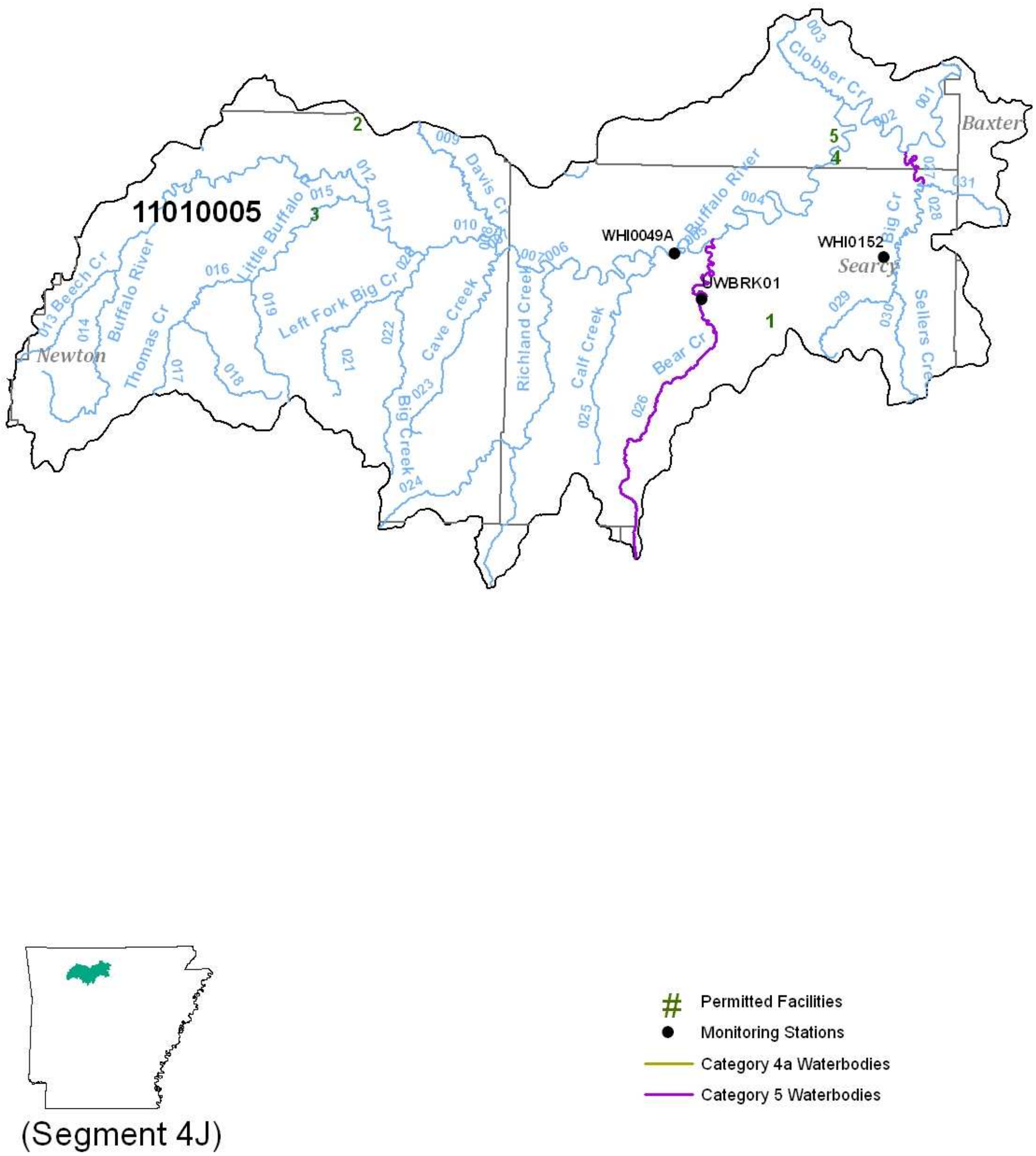


Table A-61: Planning Segment 4J—Designated Use Attainment Status and Water Quality Monitoring

						Designated Use						SOURCE				CAUSE				STATUS			
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4
SEG-4J																							
Buffalo River	11010005	-001	11.3	BUFR09	M	S	S	S	S	S	S									1			
Buffalo River	11010005	-002	8.7		M	S	S	S	S	S	S									1			
Clabber Creek	11010005	-003	7.3	BUFT17	M	S	S	S	S	S	S									1			
Buffalo River	11010005	-004	27.8	BUFR07&08	M	S	S	S	S	S	S									1			
Buffalo River	11010005	-005	6.9	WHI0049A	M	S	S	S	S	S	S									1			
Buffalo River	11010005	-006	13.7		M	S	S	S	S	S	S									1			
Buffalo River	11010005	-007	5.9	BUFR05	M	S	S	S	S	S	S									1			
Buffalo River	11010005	-008	2.6		M	S	S	S	S	S	S									1			
Davis Creek	11010005	-009	7.3	BUFT07	M	S	S	S	S	S	S									1			
Buffalo River	11010005	-010	6.2		M	S	S	S	S	S	S									1			
Buffalo River	11010005	-011	6.0	BUFR04	M	S	S	S	S	S	S									1			
Buffalo River	11010005	-012	25.8	BUFR02&03	M	S	S	S	S	S	S									1			
Sams Creek	11010005	-013	9.0		M	S	S	S	S	S	S									1			
Buffalo River	11010005	-014	18.2	BUFR01	M	S	S	S	S	S	S									1			
Little Buffalo	11010005	-015	11.6	BUFT05	M	S	S	S	S	S	S									1			
Little Buffalo	11010005	-016	6.6		E	S	S	S	S	S	S									1			
Thomas Creek	11010005	-017	5.2		U															3			
East Fork	11010005	-018	8.9		U															3			
Shop Creek	11010005	-019	8.6		U															3			
Big Creek	11010005	-020	3.2	BUFT06	M	S	S	S	S	S	S									1			
Big Creek Left Fk.	11010005	-021	11.7		E	S	S	S	S	S	S									1			
Big Creek	11010005	-022	13.7		E	S	S	S	S	S	S									1			
Big Cave Cr.	11010005	-023	13.0	BUFT08	M	S	S	S	S	S	S									1			
Richland Creek	11010005	-024	28.7	BUFT09	M	S	S	S	S	S	S									1			
Calf Creek	11010005	-025	15.0	BUFT10	M	S	S	S	S	S	S									1			
Bear Creek	11010005	-026	23.9	UWBRK01,+	M	S	N	S	S	S	S	MP				TDS				5			
Big Creek	11010005	-027	2.6	BUFT18	M	S	N	S	S	S	S	UN				DO				5			
Big Creek	11010005	-028	9.4	WHI0152	M	S	S	S	S	S	S									1			
Big Creek	11010005	-029	7.1		E	S	S	S	S	S	S									1			
Sellers Creek	11010005	-030	8.1		E	S	S	S	S	S	S									1			
Spring Creek	11010005	-031	5.8		E	S	S	S	S	S	S									1			
TOTAL MILES	339.8																						
MILES UNASSESSED	22.7																						
MILES EVALUATED	53.0																						
MILES MONITORED	264.1																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	317.1	0
FISHERIES	290.6	26.5
PRIMARY CONTACT	317.1	0
SECONDARY CONTACT	317.1	0
DRINKING SUPPLY	317.1	0
AGRI & INDUSTRY	317.1	0

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
BFR09	Buffalo River near its mouth		1	USNPS
BUFT7	Clabber Creek near mouth		1	USNPS
BFR07	Buffalo River at Highway 14		1	USNPS
BFR08	Buffalo River at Rush		1	USNPS
WHI0049A	Buffalo River at Highway 65 near St. Joe	Y	1	A
BFR05	Buffalo River at Woolum		1	USNPS
BUFT07	Davis Creek		1	USNPS
BUFR04	Buffalo River at Hasty		1	USNPS
BUFR02	Buffalo River at Ponca		1	USNPS
BUFR03	Buffalo River near Pruitt		1	USNPS
BUFR01	Buffalo River at Wilderness Boundary		1	USNPS
BUFT05	Little Buffalo River		1	USNPS
BUFT06	Big Creek - Newton County		1	USNPS
BUFT08	Cave Creek		1	USNPS
BUFT09	Richland Creek		1	USNPS
BUFT10	Calf Creek		1	USNPS
UWBRK01	Bear Creek at Highway 65, 4 miles west of Marshall		2	R
BUFT18	Big Creek - Marion County		1	USNPS
WHI0152	Big Creek at Highway 14, west of Big Flat		2	R

Table A-62: Segment 4J Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0034011	MARSHALL, CITY OF	TRIB,FOREST CR,BEAR CR,BUFFALO RV	026	11010005	Searcy	1
AR0034088	MARBLE FALLS SID	TRIB,MILL CR,BUFFALO RV,WHITE RV	012	11010005	Newton	2
AR0034584	JASPER, CITY OF	LTL BUFFALO RV,BUFFALO RV, WHITE RV	015	11010005	Newton	3
AR0034941	USDINPS-BUFFALO NATL RV-BUFFALO	BUFFALO RV, WHITE RV	004	11010005	Marion	4
AR0034959	USDINPS-BUFFALO NATL RV-BUFFALO RV STATE PARK	PANTHER CR,BUFFALO RV	004	11010005	Marion	5

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

Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies. Approximately 20 percent of these waters are designated as outstanding state or national resource waters.

The Fisheries Designated use was assessed as not supported in the West Fork of the White River and the White River downstream of the West Fork. The major cause was high turbidity levels and excessive silt loads. A TMDL to address this issue was completed in 2006.

A point source discharge to Holman Creek has impaired the drinking water use of the lower section of this stream by discharges of excessive levels of total dissolved solids. Additional investigation into this issue is currently ongoing.

Figure A-42: Planning Segment 4K

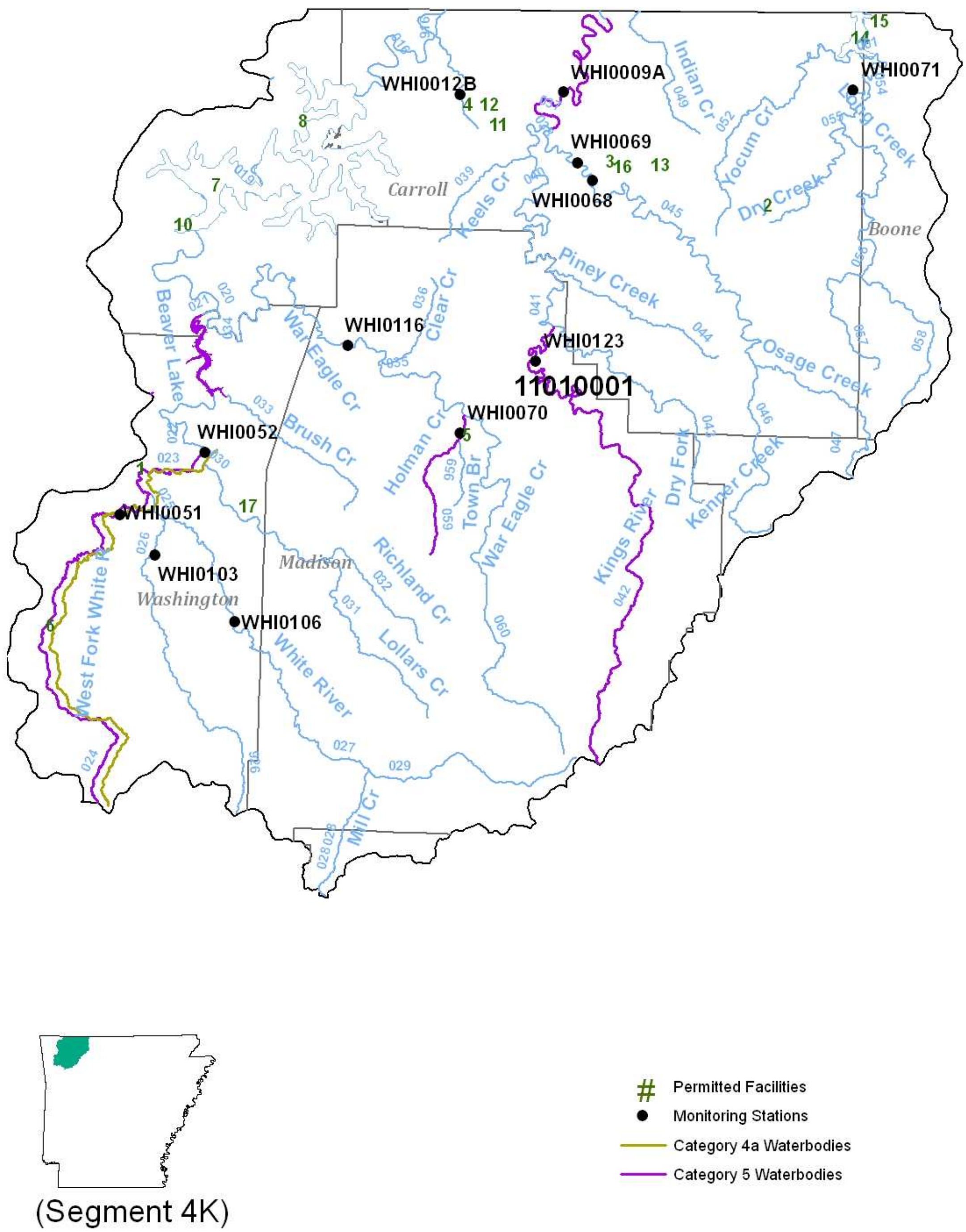


Table A-63: Planning Segment 4K—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-4K																										
White River	11010001	-022	8.3		U															3				FISH CONSUMPTION	473.6	0
White River	11010001	-023	6.2	WHI0052	M	S	N	S	S	S	S	UN	UN	UN	SE	CL	SO4	TDS	Tb	5	5	5	4a	FISHERIES	431.1	42.5
West Fork	11010001	-024	27.2	WHI0051+	M	S	N	S	S	S	S	UN	UN	SE		SO4	TDS	Tb		5	5	4a		PRIMARY CONTACT	473.6	0
White River	11010001	-025	2.4		U															3				SECONDARY CONTACT	473.6	0
Middle Fork[1]	11010001	-926	13.8	WHI0102	M	S	S	S	S	S	S									1				DRINKING SUPPLY	464.5	9.1
Middle Fork[2]	11010001	-026	8.1	WHI0103	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	464.5	9.1
White River[3]	11010001	-927	6.6	WHI0105	M	S	S	S	S	S	S									1						
White River[4]	11010001	-027	17.2	WHI0106+	M	S	S	S	S	S	S									1						
Mill Creek	11010001	-028	6.1		E	S	S	S	S	S	S									1						
White River	11010001	-029	13.5		E	S	S	S	S	S	S									1						
Richland Cr.	11010001	-030	12.1	WHI0109	M	S	S	S	S	S	S									1						
Lollar Creek	11010001	-031	12.5		E	S	S	S	S	S	S									1						
Richland Cr.	11010001	-032	7.1		E	S	S	S	S	S	S									1						
Brush Creek	11010001	-033	13.5	WHI0112	M	S	S	S	S	S	S									1						
War Eagle Cr.	11010001	-034	22.2	WHI0116	M	S	S	S	S	S	S									1						
War Eagle Cr.	11010001	-035	8.6		E	S	S	S	S	S	S									1						
Leatherwood Creek	11010001	-916	7.6	WHI0012B	M	S	S	S	S	S	S									1						
Clear Creek	11010001	-036	6.7		E	S	S	S	S	S	S									1						
Kings River	11010001	-037	19.1	WHI0009A	M	S	S	S	S	S	S	UN				TDS				5						
Kings River	11010001	-038	3.4	WHI0077	M	S	S	S	S	S	S									1						
Kings River	11010001	-040	17.9		E	S	S	S	S	S	S									1						
Kings River	11010001	-041	4.8	WHI0121	M	S	S	S	S	S	S									1						
Kings River	11010001	-042	39.5	WHI0123	M	S	S	S	S	S	S	UN				TDS				5						
Keels Creek	11010001	-039	7.3		E	S	S	S	S	S	S									1						
Dry Fork	11010001	-043	16.5	WHI0127	M	S	S	S	S	S	S									1						
Piney Creek	11010001	-044	10.2	WHI0126	M	S	S	S	S	S	S									1						
Osage Creek[5]	11010001	-945	25.6	WHI0068+	M	S	S	S	S	S	S									1						
Osage Creek[6]	11010001	-045	5.0	WHI0069	M	S	S	S	S	S	S									1						
South Fork	11010001	-046	13.8		E	S	S	S	S	S	S									1						
Osage Creek	11010001	-047	13.4		E	S	S	S	S	S	S									1						
Yocum Creek	11010001	-052	16.2	WHI0137	M	S	S	S	S	S	S									1						
Long Creek	11010001	-054	8.4	WHI0071	M	S	S	S	S	S	S									1						
Dry Creek	11010001	-055	12.0		E	S	S	S	S	S	S									1						
Long Creek	11010001	-056	14.3	WHI0134+	M	S	S	S	S	S	S									1						
Long Creek	11010001	-057	8.6		E	S	S	S	S	S	S									1						
Terrapin Cr.	11010001	-058	11.2		E	S	S	S	S	S	S									1						
Holman Creek	11010001	-059	9.1	WHI0070	M	S	N	S	S	N	N		MP	SE			TDS	Tb		5	5	4a				
War Eagle Cr.	11010001	-060	28.3	WHI0114	M	S	S	S	S	S	S									1						
TOTAL MILES	484.3																									
MILES UNASSESSED	10.7																									
MILES EVALUATED	138.7																									
MILES MONITORED	334.9																									

1 Reach formally -026U
2 Reach formally -026L
3 Reach formally -027U
4 Reach formally -027L
5 Reach formally -045U
6 Reach formally -045L

Table A-63 (cont.): Planning Segment 4K—Designated Use Attainment Status and Water Quality Monitoring Stations

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
WHI0052	White River near Goshen	Y	1	A
WHI0098	West Fork White River at county road bridge below Dye Creek near West Fork		2	R
WHI0051	West Fork White River near Fayetteville	Y	1	A
WHI0102	Middle Fork White River at county road 32, 1mile south of Sulphur City		2	R
WHI0103	Middle Fork White River west of Elkins	Y	1	A
WHI0106	White River near Durham		1	A
WHI0105	White River near Crosses		2	R
WHI0109	Richland Creek 1 mile north of Tuttle		2	R
WHI0112	Brush Creek north of Highway 45 off Highway 303		2	R
WHI0116	War Eagle Creek at Highway 45, north of Hindsville	Y	1	A
WHI0012B	Leatherwood Creek near Eureka Springs		1	A
WHI009A	Kings River north of Berryville	Y	1	A
WHI0077	Kings River below Berryville		2	R
WHI0121	Kings River at Highway 21		2	R
WHI0123	Kings River northeast of Alabam	Y	1	A
WHI0127	Dry Fork Creek west of Metalton		2	R
WHI0126	Piney Creek northwest of Metalton		2	R
WHI0068	Osage Creek above Berryville	Y	1	A
WHI0130	Osage Creek northeast of Metalton		2	R
WHI0069	Osage Creek below Berryville		1	A
WHI0137	Yocum Creek on county road 1.25 miles northwest of Highway 311		2	R
WHI0071	Long Creek below Denver	Y	1	A
WHI0134	Long Creek near Denver		2	R
WHI0175	Callens Branch near Denver		2	R
WHI0070	Holman Creek below Huntsville		1	A
WHI0113	War Eagle Creek at county road bridge west of Highway 23		2	R
WHI0114	War Eagle Creek at Highway 412		2	R

Table A-64: Segment 4K Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0020010	FAYETTEVILLE, CITY OF	WHITE RV (001) & TRIB,MUD CR (002)	012	11010001	Washington	1
AR0021741	GREEN FOREST, CITY OF-WWTP	TRIB,DRY CR,LONG CR,WHITE R	055	11010001	Carroll	2
AR0021792	BERRYVILLE, CITY OF	MILL BR,FREEMAN BR,OSAGE CR,KINGS RV	045	11010001	Carroll	3
AR0021865	EUREKA SPRINGS, CITY OF	LEATHERWOOD CR,TABLE ROCK LK,WHITE	016	11010001	Carroll	4
AR0022004	HUNTSVILLE, CITY OF	TOWN BR,HOLMAN CR,WAR EAGLE CR,WHITE RV	959	11010001	Madison	5
AR0022373	WEST FORK, CITY OF	W FK/WHITE RV,WHITE RV,BEAVER LK	024	11010001	Washington	6
AR0033197	HERITAGE BAY HOMEOWNERS ASSN	BEAVER LK,WHITE RV	017	11010001	Benton	7
AR0036676	LOST BRIDGE VILLAGE WATER & SE	BEAVER LK, WHITE RV	017	11010001	Benton	8
AR0037249	HOLIDAY ISLAND SUBURBAN IMPROVEMENT DISTRICT	TABLE ROCK LK, WHITE RV	016	11010001	Carroll	9
AR0037320	MOUNT NE BEAVER LAKE CAMP	MONTE NE COVE,BEAVER LK,WHITE RV	020	11010001	Benton	10
AR0040118	COUNTRY MOUNTAIN INN, INC	TRIB,KEELS CR,KINGS R	039	11010001	Carroll	11
AR0044300	VPG PARTNERS II, LLC - D/B/A STATUE ROAD INN	TRIB,LEATHERWOOD CR,TABLE ROCK LAKE,WHITE RIVER	016	11010001	Carroll	12
AR0047619	CARROLL COUNTY STONE, INC.	UNNAMED TRIB,WARDEN BR,OSAGE CR,KINGS RV	045	11010001	Carroll	13
AR0048844	OUTDOOR RESORTS OF THE OZARKS,	TABLE ROCK RSRV,IMPD/WHITE RV	006	11010001	Carroll	14
AR0049191	CRICKET CREEK RV ESTATES	UNNAMED TRIB, TABLE ROCK LK, WHITE RV	006	11010001	Boone	15
AR0049867	BEDFORD FALLS MOBILE HOME PARK	TRIB,OSAGE CR,KINGS RV,TABLE ROCK LK	045	11010001	Carroll	16
AR0051501	WASHINGTON CO ROAD DEPT - GOSHEN TUTTLE QUARRY	TRIB RICHLAND CR, RICHLAND CR, WHITE RV	030	11010001	Washington	17

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ST. FRANCIS RIVER BASIN

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 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, Woodruff, and Lee. 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. This segment includes the Little River Basin and Pemiscot Bayou.

Summary of Water Quality Conditions

Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies. These three segments are discussed as one unit due to the consistent nature of the water quality. The overriding impact of land use on water quality can be seen in this segment. This basin contains 933.1 stream miles of which approximately 14 percent are designated as outstanding resources. 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 elevated 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 Fisheries designated use. A TMDL has been completed for siltation/turbidity in the L'Anguille River basin in 2002.

Figure A-45: Planning Segment 5A

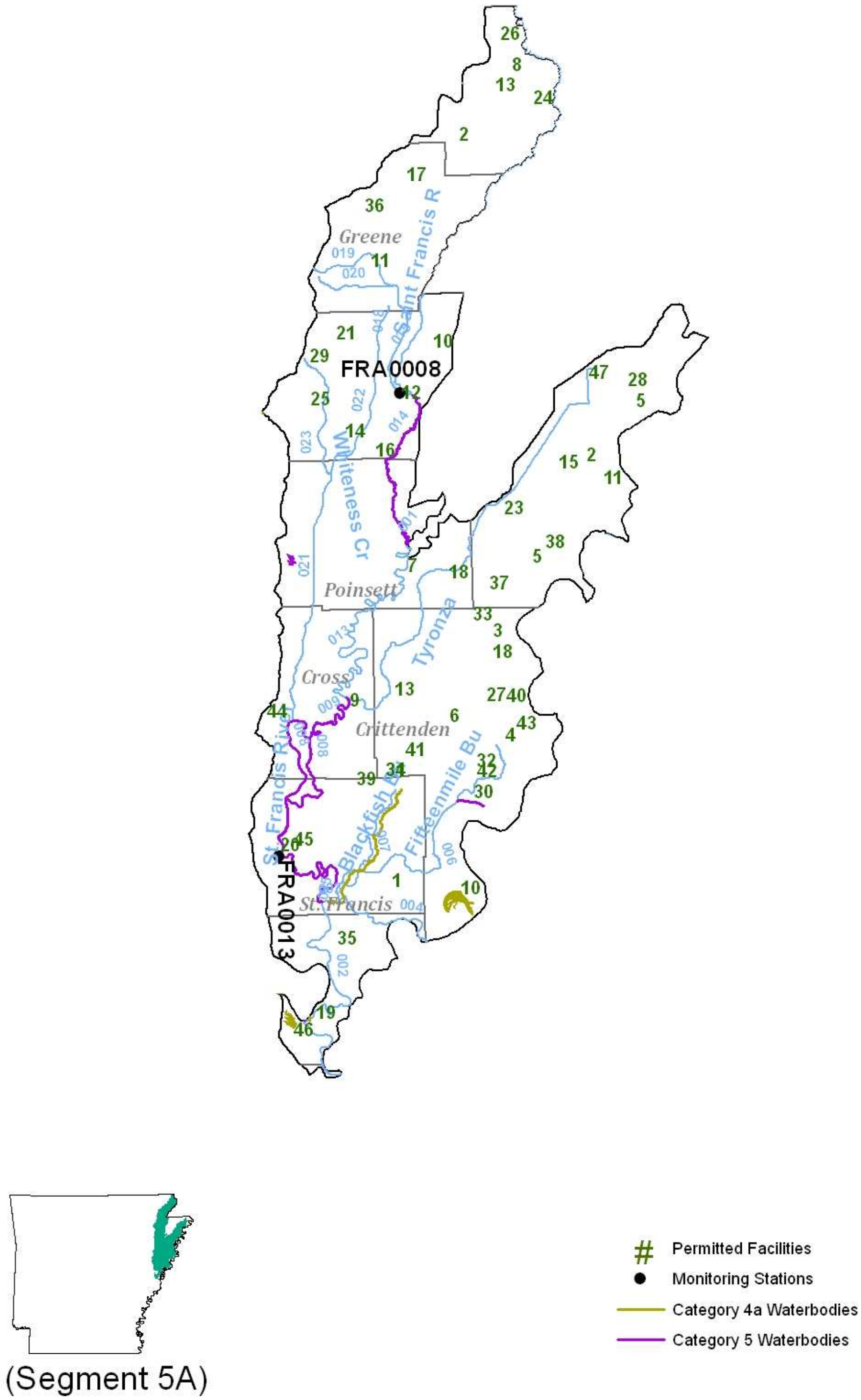


Table A-65: Planning Segment 5A—Designated Use Attainment Status and Water Quality Monitoring Stations

						Designated Use						SOURCE				CAUSE				STATUS						
STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	FC	FSH	PC	SC	DW	AI	1	2	3	4	1	2	3	4	1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-5A																										
St. Francis R.	8020203	-001	11.9		E	S	S	S	S	S	S									1				FISH CONSUMPTION	368.8	0
St. Francis R.	8020203	-002	25.5		E	S	S	S	S	S	S									1				FISHERIES	351.5	17.3
Blackfish Bayou	8020203	-003	2.4		E	S	S	S	S	S	S	AG				Tb				4a				PRIMARY CONTACT	368.8	0
Frenchmans B.	8020203	-004	14.5		E	S	S	S	S	S	S									1				SECONDARY CONTACT	368.8	0
Blackfish Bayou	8020203	-005	2.6		E	S	S	S	S	S	S	AG				Tb				4a				DRINKING SUPPLY	368.8	0
Fifteen Mile B.	8020203	-006	38.4	FRA0028	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	368.8	0
Ten Mile Bayou[1]	8020203	-906	17.3	FRA0029	M	S	N	S	S	S	S	UN				DO				5						
Blackfish Bayou	8020203	-007	16.1	FRA0027	M	S	S	S	S	S	S	AG				Tb				4a						
St. Francis R.	8020203	-008	55.9	FRA0013	M	S	S	S	S	S	S	AG	AG			Cl	Tb			5	5					
St. Francis R.	8020203	-009	17.1		E	S	S	S	S	S	S	AG	AG			Cl	Tb			5	5					
Tyronza River	8020203	-010	31.0	FRA0032	M	S	S	S	S	S	S									1						
Big Creek	8020203	-011	15.8		E	S	S	S	S	S	S									1						
Tyronza River	8020203	-012	50.0	FRA0033	M	S	S	S	S	S	S									1						
St. Francis R.	8020203	-013	47.5	FRA0036	M	S	S	S	S	S	S									1						
St. Francis R.	8020203	-014	22.8	FRA0008	M	S	S	S	S	S	S	AG				Cl				5						
St. Francis R.	8020203	-015	90.8		U															3						
Eightmile Ditch	8020203	-018	17.8		U															3						
Eightmile Ditch	8020203	-019	12.8		U															3						
Village Creek	8020203	-020	9.0		U															3						
Whiteness Cr.	8020203	-021	33.6		U															3						
Big Boy Creek	8020203	-022	24.2		U															3						
Whiteness Cr.	8020203	-023	15.0		U															3						
TOTAL MILES	572.0																									
MILES UNASSESSED	203.2																									
MILES EVALUATED	89.8																									
MILES MONITORED	279.0																									

1 Reach formally -006t

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
FRA0028	15 Mile Bayou at Simsboro Road near Proctor		2	R
FRA0029	10 Mile Bayou at Highway 147 near Edmondson		2	R
FRA0027	Blackfish Bayou at Highway 50 near Woldwood		2	R
FRA0013	St. Francis River at Highway 50 near Forrest City	Y	1	A
FRA0032	Tyronza River at Highway 184 near Earl		2	R
FRA0033	Tyronza River at Highway 133 near Tyronza		2	R
FRA0036	St. Francis River at Highway 140 at Marked Tree		2	R
FRA0008	St. Francis River at Highway 18 near Lake City	Y	1	A

Figure A-46: Planning Segment 5B

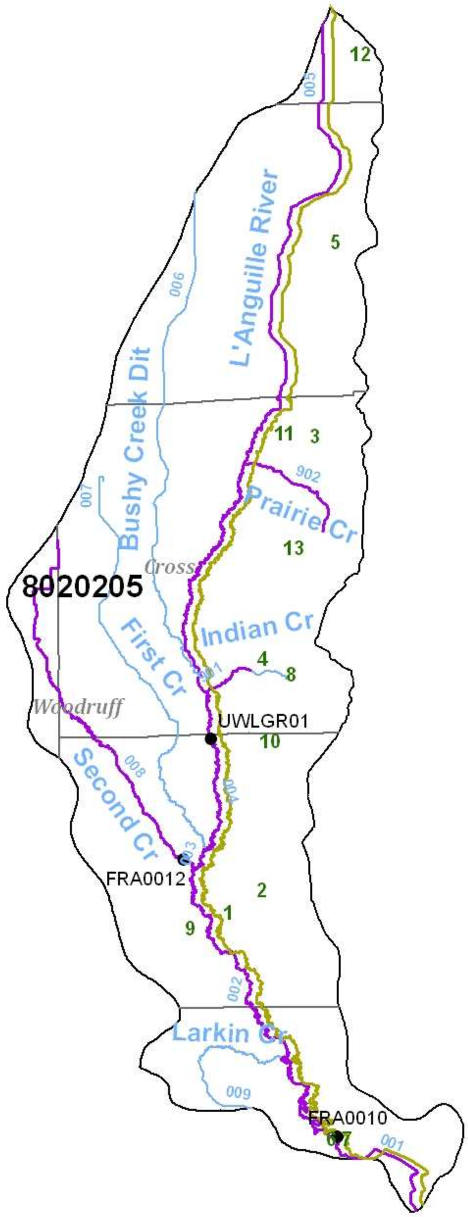
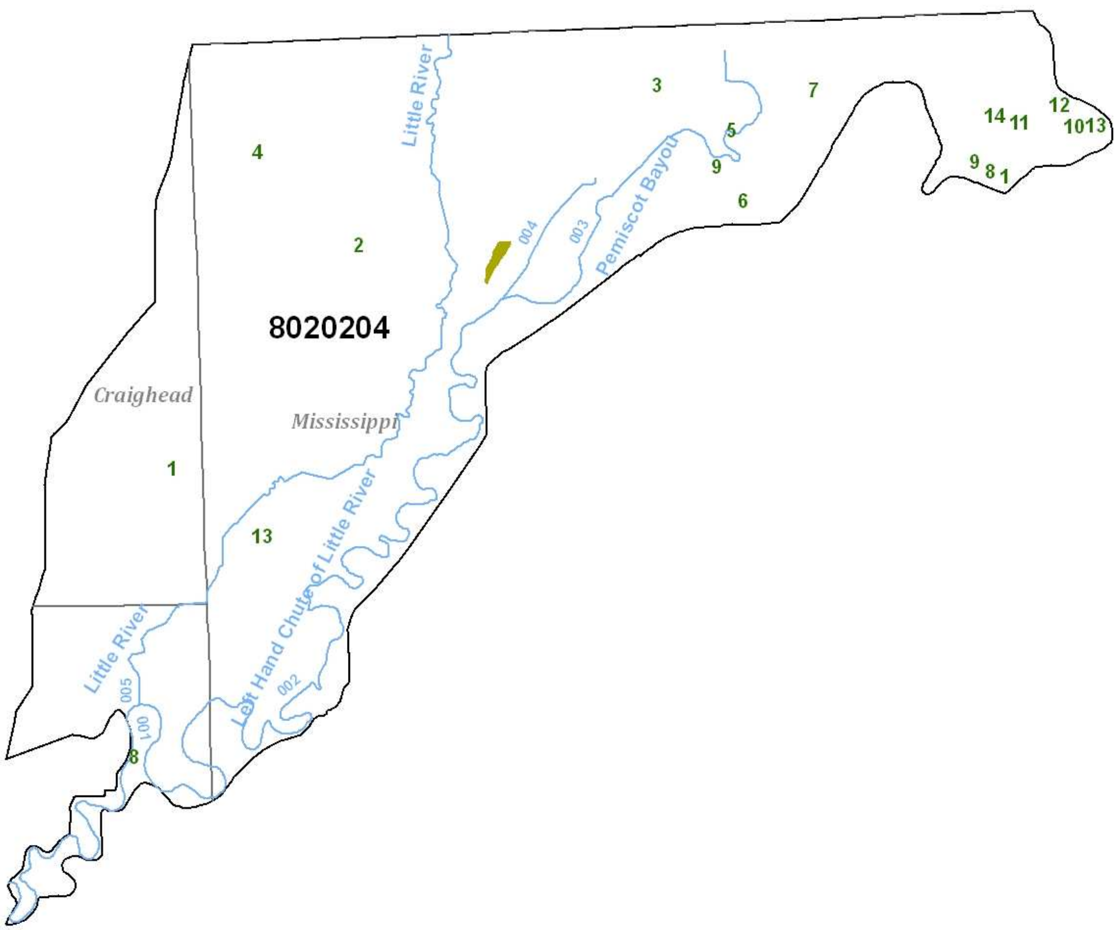


Table A-66: Planning Segment 5B—Designated Use Attainment Status and Water Quality Monitoring

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-5B																										
L'Anguille R.	8020205	-001	19.7	FRA0010	M	S	N	S	S	S	S	AG	AG	AG	SE	DO	Cl	TDS	Tb	5	5	5	4a	FISH CONSUMPTION	165.1	0
L'Anguille R.	8020205	-002	16.8		E	S	N	S	S	S	S	AG	AG	AG	SE	DO	Cl	TDS	Tb	5	5	5	4a	FISHERIES	50.3	114.8
L'Anguille R.	8020205	-003	1.8		E	S	N	S	S	S	S	AG	AG	AG	SE	DO	Cl	TDS	Tb	5	5	5	4a	PRIMARY CONTACT	105	60.1
Caney Creek	8020205	-901	9.0	FRA0034	M	S	S	S	S	S	S	MP				TDS				5				SECONDARY CONTACT	165.1	0
L'Anguille R.	8020205	-004	16.0	UWLGR01	M	S	N	N	S	S	S	AG	AG	SE	AG	DO	MN	Tb	PA	5	5	4a	4a	DRINKING SUPPLY	165.1	0
L'Anguille R.	8020205	-005	44.1	UWLGR02	M	S	N	N	S	S	S	AG	AG	SE	AG	DO	MN	Tb	PA	5	5	4a	4a	AGRI & INDUSTRY	165.1	0
Prairie Creek	8020205	-902	13.4	FRA0035	M	S	S	S	S	S	S	AG	AG	AG		Cl	SO4	TDS		5	5	5				
Brushy Creek	8020205	-006	30.7		U															3						
First Creek	8020205	-007	27.9	FRA0030	M	S	S	S	S	S	S									1						
Second Creek	8020205	-008	16.4	FRA0012+	M	S	N	S	S	S	S	AG				DO				5						
Larkin Creek	8020205	-009	12.3		U															3						
TOTAL MILES	208.1															MN = Cl, SO4, TDS										
MILES UNASSESSED	43.0																									
MILES EVALUATED	18.6																									
MILES MONITORED	146.5																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
FRA0010	L'Anguille River at Highway 50 near Marianna	Y	1	A
FRA0034	Caney Creek at Highway 305 near Wynne		2	R
UWLGR01	L'Anguille River at Highway 306 near Wynne		1	A
UWLGR02	L'Anguille River at Highway 214 west of Whitehall		2	R
FRA0035	Prairie Creek at Highway 1 north of Vanndale		2	R
FRA0030	First Creek near Horton		2	R
FRA0012	Second Creek on county road north of Palestine	Y	1	A
FRA0031	Second Creek at Highway 284 near Penrose		2	R

Figure A-47: Planning Segment 5C



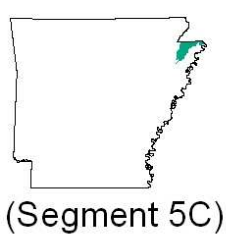


Table A-67: Planning Segment 5C—Designated Use Attainment Status and Water Quality Monitoring Stations

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4	USE	SUPPORT	NON-SUPPORT
SEG-5C																								FISH CONSUMPTION	153.0	0.0
Little River Left	8020204	-001	20.3	FRA0037	M	S	S	S	S	S	S									1				FISHERIES	153.0	0.0
Little River	8020204	-002	61.7		E	S	S	S	S	S	S									1				PRIMARY CONTACT	153.0	0.0
Pemiscot Bayou	8020204	-003	28.0		E	S	S	S	S	S	S									1				SECONDARY CONTACT	153.0	0.0
Little River	8020204	-004	6.0		E	S	S	S	S	S	S									1				DRINKING SUPPLY	153.0	0.0
Little River Right	8020204	-005	37.0	FRA0038	M	S	S	S	S	S	S									1				AGRI & INDUSTRY	153.0	0.0
TOTAL MILES	153.0																									
MILES UNASSESSED	0.0																									
MILES EVALUATED	95.7																									
MILES MONITORED	57.3																									

Station Name	Station Location	Flow Gauge	Data Period	Monitoring Network
FRA00037	Left Hand Chute of Little River at Highway 140 near Lepanto		2	R
FRA00038	Right Hand Chute of Little River at Highway 135 at Riverdale		2	R

Table A-68: Segment *5A Active NPDES Permits*

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0021547	HUGHES, CITY OF	CROOKED BU,MILLSEED LK,FRENCHMAN BU	004	8020203	St. Francis	1
AR0021911	RECTOR, CITY OF	UNNAMED TRIB,POST OAK CR,BIG SLU,ST FRANCIS RV	015	8020203	Clay	2
AR0021954	TURRELL, CITY OF	BIG CR,TYRONZA R,ST FRANCIS RV	011	8020203	Crittenden	3
AR0021971	MARION, CITY OF	15-MILE BU,BLACKFISH BU,ST FRANCIS	006	8020203	Crittenden	4
AR0022152	JOINER, CITY OF	DIT #4,FRENCHMAN'S BU,DIT #11,BELL HAMMER SLOUGH	004	8020203	Mississippi	5
AR0022195	CRAWFORDSVILLE, CITY OF	ALLIGATOR BU,DTCH 19, 15 MIBU,BLACKFSH BU,	006	8020203	Crittenden	6
AR0033430	MARKED TREE, CITY OF	ST FRANCIS RV	013	8020203	Poinsett	7
AR0033472	PIGGOTT, CITY OF	BIG SLOUGH DIT,ST FRANCIS RV	014	8020203	Clay	8
AR0033588	PARKIN, CITY OF	ST FRANCIS RIVER	009	8020203	Cross	9
AR0033651	MONETTE, CITY OF	LTL DIT #3,COCKLE BURR SL, ST FRANC RV	014	8020203	Craighead	10
AR0033766	PARAGOULD, CITY LIGHT, WATER & CABLE	TRIB,EIGHT MILE CR,ST FRANCIS RV	019	8020203	Greene	11
AR0034134	LAKE CITY, CITY OF	PURCELL SLU DIT #9, ST FRANCIS RV	014	8020203	Craighead	12
AR0034304	EARLE, CITY OF	TYRONZA RV,ST FRANCIS RV	010	8020203	Crittenden	13
AR0034312	BAY, CITY OF	DIT #6,MAIN DIT,ST.FRANCIS RV	022	8020203	Craighead	14
AR0034754	KEISER, CITY OF	VDIT #31,TYRONZA R,ST FRANCIS RV	012	8020203	Mississippi	15
AR0035602	TRUMANN, CITY OF-WWTP	DIT #60,ST FRANCIS RV	014	8020203	Poinsett	16
AR0035629	MARMADUKE, CITY OF	BIG SLOUGH DIT,ST. FRANCIS RV	015	8020203	Greene	17
AR0035637	TYRONZA, CITY OF	TYRONZA RV	012	8020203	Poinsett	18
AR0036897	U.S. ARMY COE - W.G. HUXTABLE PLANT	ST FRANCIS RIVER	002	8020203	Lee	19
AR0037893	MADISON, CITY OF	ST FRANCIS R	008	8020203	St. Francis	20
AR0037974	BROOKLAND, CITY OF	TRIB,MAPLE SLU DIT,GUM SLU DIT,BIG BAY DIT,DIT #10	022	8020203	Craighead	21
AR0038202	ARK PARKS VILLAGE CREEK	VILLAGE CR,CLARK CORNER CUTOFF,...	020	8020203	Cross	22
AR0039047	DYESS, CITY OF	TYRONZA R,ST FRANCIS RV	012	8020203	Mississippi	23
AR0042196	NIMMONS, CITY OF	DIT,HAMPTON SLU,MAYO DIT,BIG SLOUGH DIT,ST. FRANCI	015	8020203	Clay	24
AR0043591	ST FRANCIS, CITY OF	ST FRANCIS RV	015	8020203	Clay	26
AR0044024	RECREATIONAL ADVENTURE CO. - MEMPHIS KOA	DIT,15-MILE BU,ST FRANCIS RV	006	8020203	Crittenden	27
AR0044237	BURDETTE, TOWN OF	DIT #24,#31,#6,TYRONZA RV,ST FRANCIS RV	012	8020203	Mississippi	28
AR0044521	HERITAGE HILLS MOBILE HOME PARK	LATERAL #1,#2,LTL BAY DTCH,#10,#23	023	8020203	Craighead	29
AR0044661	EDMONDSON, CITY OF	15-MILE BU,BLACKFISH BU,ST FRANCIS	006	8020203	Crittenden	30

Table A-68 (cont.): Segment *5A Active NPDES Permits*

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0044695	HANUMANTA, LLC - SUPER 8 MOTEL	SHELL LK,BLACKFISH BU,ST. FRANCIS RV	007	8020203	St. Francis	31
AR0044890	NIMOCKS OIL COMPANY, INC.	TRIB,15-MILE BU,BLACKFISH BU,ST FRANCIS RV	006	8020203	Crittenden	32
AR0045021	GILMORE, CITY OF	LTL CYPRESS DIT,BIG CR,GIBSON BU	011	8020203	Crittenden	33
AR0045403	WEST MEMPHIS TRAVEL CENTER	DITCH 22,BLACKFISH BU,ST FRANCIS RV	007	8020203	St. Francis	34
AR0045578	EAST ARK CORRECTIONAL FACILITY	ST FRANCIS RV (NEAR ALLIGATOR BU)	002	8020203	Lee	35
AR0045837	OAK GROVE HEIGHTS SEWER	TRIB,LOCUST CR,8-MILE DIT	019	8020203	Greene	36
AR0045934	BIRDSONG, CITY OF	SNAKE LK,LAMB BU,DIT# 1,LTL CYPRESS	011	8020203	Mississippi	37
AR0046272	BASSETT, CITY OF	TRB,DIT# 5,FRCHMN BU,DIT# 11,BELLHAM	012	8020203	Mississippi	38
AR0046761	MAPCO EXPRESS, INC. # 3155	TRIB,BLAKFISH BU,ST FRANCIS RV	007	8020203	St. Francis	39
AR0047490	FAST MARKET	DIT,15-MILE BU,BLACKFISH UB, ST FRANCIS RV	006	8020203	Crittenden	40
AR0048151	JENNETTE, TOWN OF	BLACKFISH BU,ST FRANCIS RV	007	8020203	Crittenden	41
AR0050121	PJs COUNTRY STORE	DIT,DIT # 11,15-MILE BU,ST FRANCIS RV	006	8020203	Crittenden	42
AR0050164	FLASH MARKET, INC. - # 152	SW DRAIN,DIT,DIT # 10,10-MI BU,15-MI BU,ST FRANCIS	003	8020203	Crittenden	43
AR0050423	COLLIER RENTALS, LLC	TRIB,COPPERAS CR,ST FRANCIS R	008	8020203	Cross	44
AR0051063	WIDENER, TOWN OF	ST FRANCIS R DIV DIT, ST FRANCIS RV	008	8020203	St. Francis	45
AR0051845	MISSISSIPPI RV STATE PARK	BEAR CR,ST FRANCIS RIVER	001	8020203	Lee	46
AR0049425	ASSOC.ELEC.CO-OP,INC.AECI/DELL	TRIB, DIT # 27,DIT # 6,TYRONZA R,ST FRANCIS RV	012	8020203	Mississippi	47

Table A-69: Segment 5B Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0000370	ENTERGY-HAMILTON MOSES	TRIB,L'ANGUILLE RV,ST FRANCIS RV	002	8020205	St. Francis	1
AR0020087	FORREST CITY, CITY OF	TRIB,L'ANGUILLE RV,ST FRANCIS RV	002	8020205	St. Francis	2
AR0021393	CHERRY VALLEY, CITY OF	COPPER CR,WOLF CR,L'ANGUILLE R,ST FRANCIS RV	005	8020205	Cross	3
AR0021903	WYNNE, CITY OF	DIT,CANEY,CR,L'ANGILLE RV	004	8020205	Cross	4
AR0033863	HARRISBURG, CITY OF	TOWN CR,LTRL T,HOLLOW BR,L'ANGUILLE	005	8020205	Poinsett	5
AR0034142	MARIANNA, CITY OF-POND B	L'ANGUILLE RV,ST FRANCIS RV	001	8020205	Lee	6
AR0034169	MARIANNA, CITY OF-POND A	L'ANGUILLE RV,ST FRANCIS RV	001	8020205	Lee	7
AR0038679	SHADY OAKS TRAILER PARK	TRIB,BEAR CR,CANEY CR,L'ANGUILLE R,ST FRANCIS RV	901	8020205	Cross	8
AR0039365	PALESTINE, CITY OF	L'ANGUILLE RV, ST. FRANCIS RV	002	8020205	St. Francis	9
AR0043192	COLT, CITY OF	TAYLOR CR DIT,L'ANGUILLE RV;ST FRANCIS RV	001	8020205	St. Francis	10
AR0044041	CROSS COUNTY HIGH SCHOOL	COOPER CR,L'ANGUILLE RV,ST FRANCIS RV	005	8020205	Cross	11
AR0048658	HUNTERS GLEN OWNERS ASSN	CR,DIT # 1,MULLIGAN LTRL,L'ANGUILLE RV,ST FRANCIS RV	005	8020205	Craighead	12
AR0049409	VANNDALE BIRDEYE WATER	LANGUILLE RV	012	8020205	Cross	13

Table A-70: Segment 5C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0020028	CARAWAY, CITY OF	DIT,ASHER DIT,DIT #4,ST. FRANCIS RV	005	8020204	Craighead	1
AR0021881	MANILA, CITY OF	DIT #81,LITTLE RV,ST. FRANCIS RV	005	8020204	Mississippi	2
AR0021962	GOSNELL, CITY OF	DIT 29,PEMISCOT BU	003	8020204	Mississippi	3
AR0022012	LEACHVILLE, CITY OF	HONEY CYPRESS DIT,BUFFALO CR DIT	005	8020204	Mississippi	4
AR0022560	BLYTHEVILLE, CITY OF-WEST WWTF	DIT #27,LEFTHAND CHUTE/LITTLE R,ST FRANCIS RV	003	8020204	Mississippi	5
AR0022578	BLYTHEVILLE, CITY OF-SOUTH WWTF	TRIB,DIT #17,DIT #6,DIT #1,ST FRANC	003	8020204	Mississippi	6
AR0022586	BLYTHEVILLE, CITY OF-NORTH WWTF	TRIB,DIT #30,DIT #27,L CHUTE,LT RV	003	8020204	Mississippi	7
AR0023841	LEPANTO, CITY OF	LEFT HAND CHUTE,LITTLE RV	001	8020204	Poinsett	8
AR0044181	RANDY E. MOODY D/B/A WHEEL ACRES	UNNAMED TRIB, DIT #36,PEMISCOT BU,ST FRANCIS RV	003	8020204	Mississippi	9
AR0045977	NUCOR STEEL - HICKMAN MILL	DIT,CROOKED LAKE BU,PEMISCOT BU	003	8020204	Mississippi	10
AR0046523	MAVERICK TUBE CORPORATION	DIT #38,CROOKD BU,PEMISCOT BU,LTL ST FRANCIS RV	003	8020204	Mississippi	11
AR0049166	TMK - IPSCO TUBULARS, INC. - BLYTHEVILLE	DIT,DIT #42,CROOKED LAKE BU, PEMISCOT BU	003	8020204	Mississippi	12
AR0050741	ETOWAH, CITY OF/LAGOON SYSTEM	RIGHT HAND CHUTE/LITTLE RV FLOODWAY	005	8020204	Mississippi	13
AR0050776	ROLL COATER, INC	DIT 49,CRKD LK BU,PEMISC BU,ST.FR RV	003	8020204	Mississippi	14

MISSISSIPPI RIVER BASIN

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

Waters in this segment are designated for propagation of fish and wildlife; primary and secondary contact recreation; and domestic, agricultural, and industrial water supplies. These three segments include 437 miles of the Mississippi River. No recent data were 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.

Through a combined effort of the US Corps of Engineers, The Nature Conservancy, Audubon, the Lower Mississippi River Conservation Committee, and many other entities, a Lower Mississippi River Resource Assessment survey has been initiated. When completed, the survey will identify the ecological, economical, navigational, and recreational resources of the Mississippi River from Cairo, Illinois to the Gulf of Mexico. The report will function as the blueprint for future economic development of the Mississippi River delta by implementing ecological based development.

Figure A-49: Planning Segment 6A

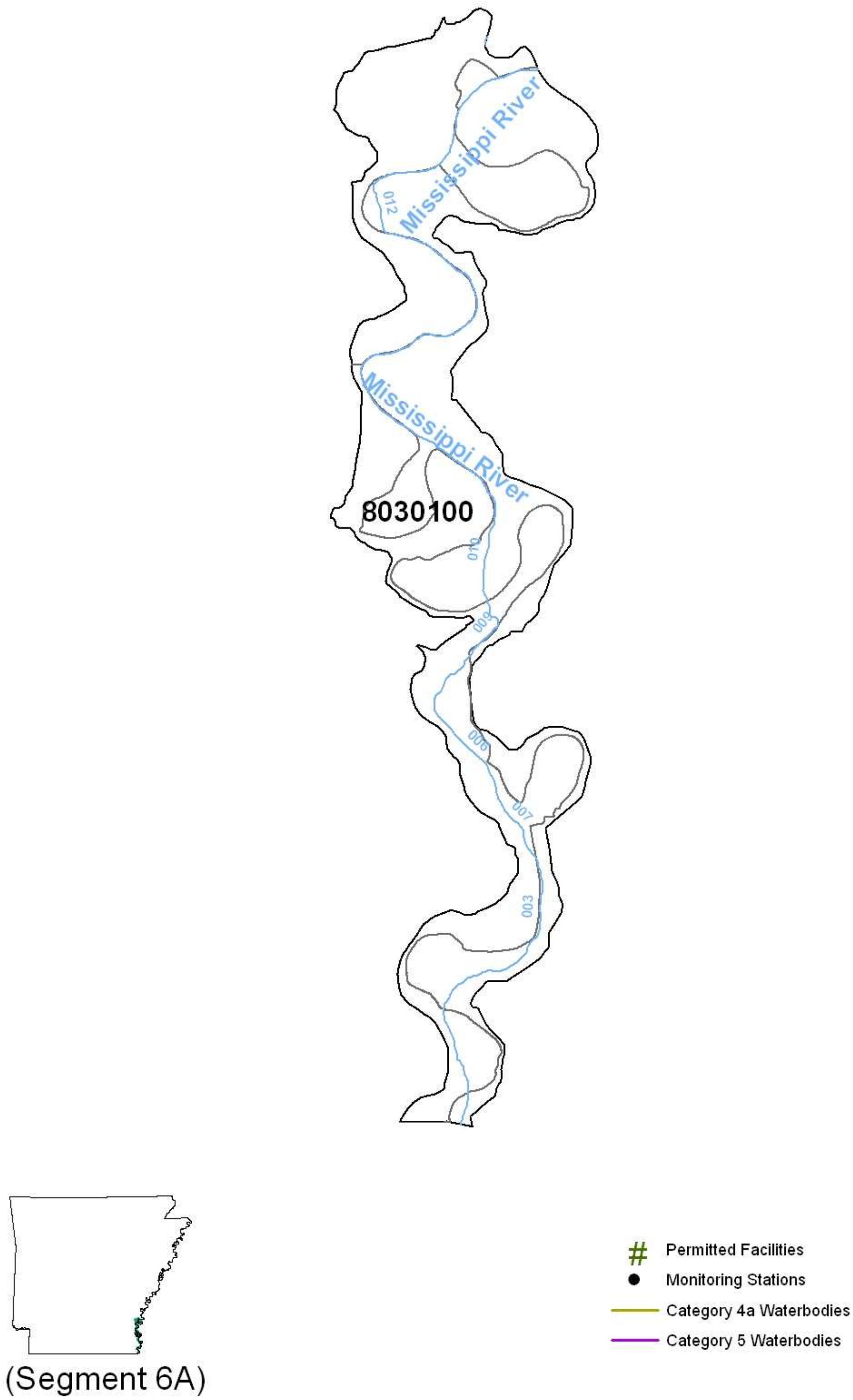


Figure A-50: Planning Segment 6B

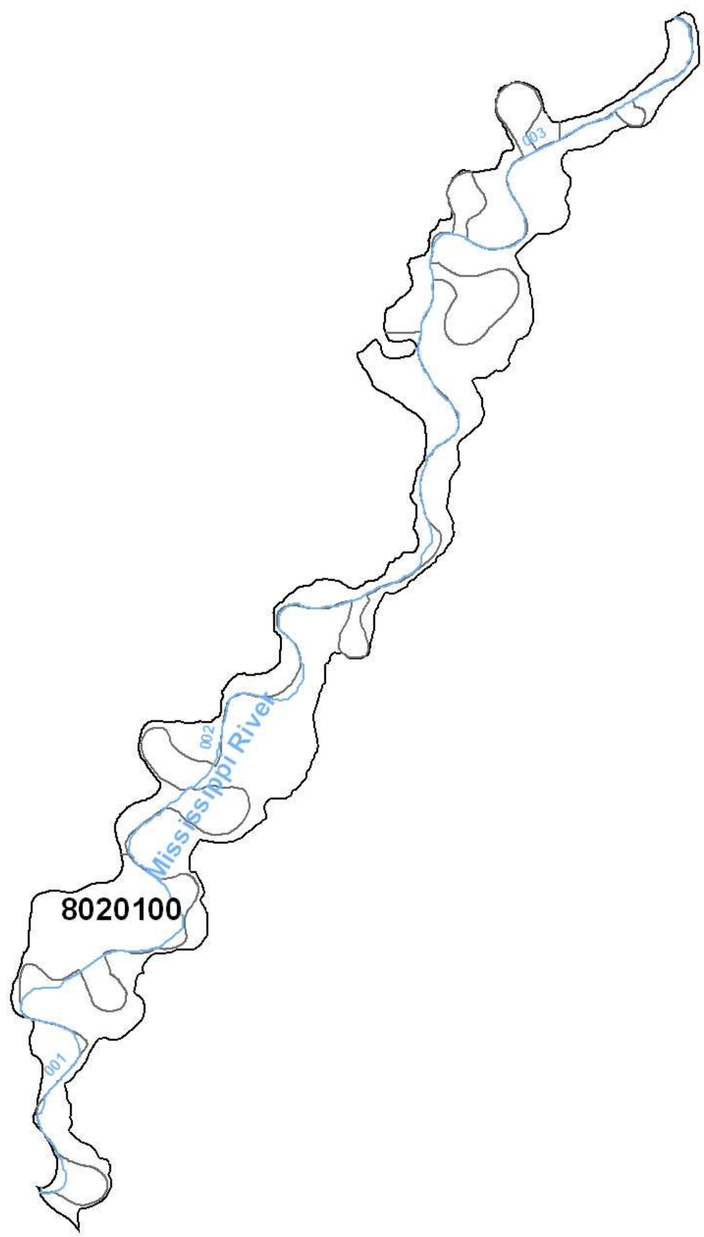


Figure A-51: Planning Segment 6C

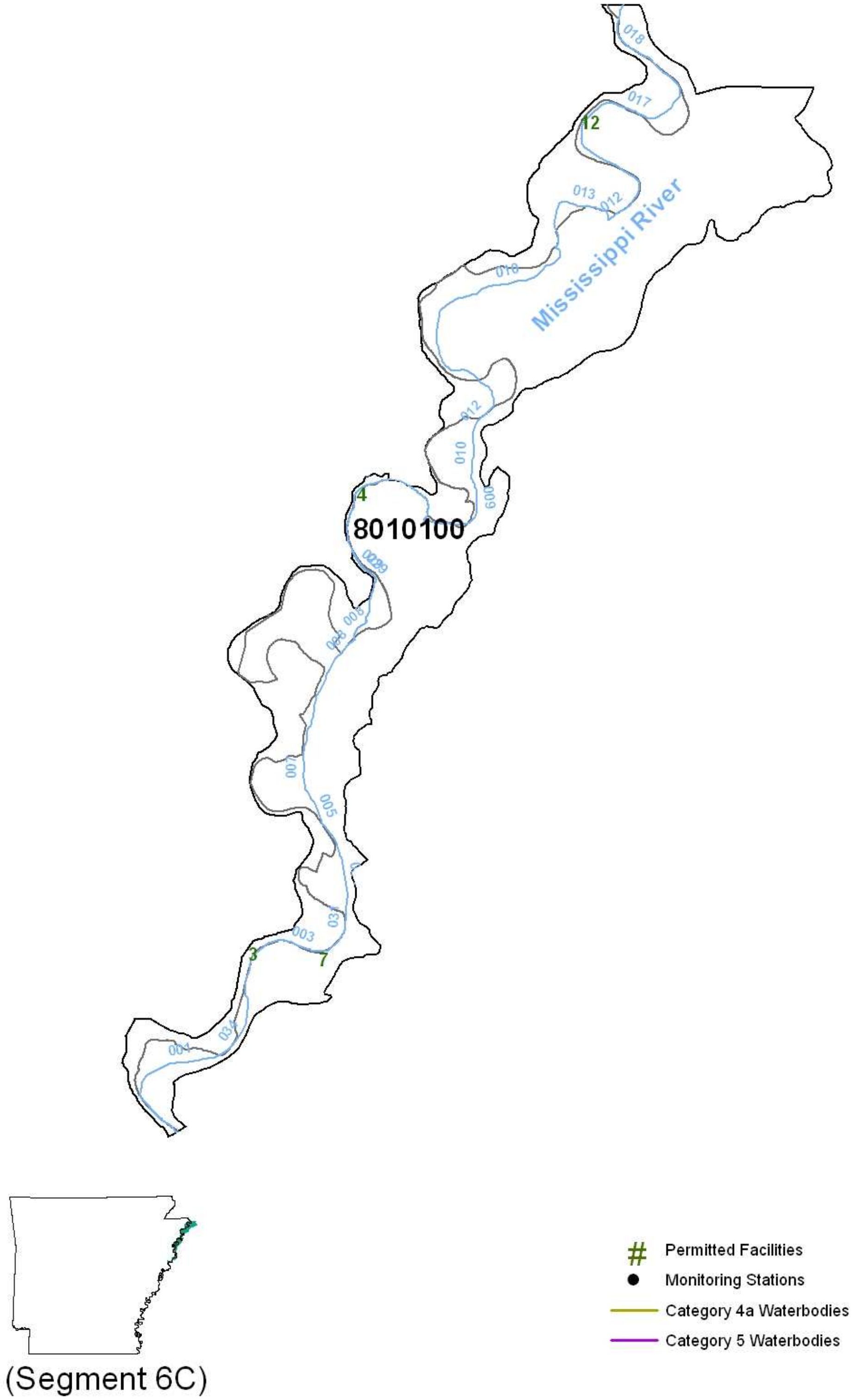


Table A-73: Planning Segment 6A, 6B, 6C—Designated Use Attainment Status

STREAM NAME	H.U.C.	RCH	MILES	STATION	ASSESS	Designated Use FC	FSH	PC	SC	DW	AI	SOURCE 1	2	3	4	CAUSE 1	2	3	4	STATUS 1	2	3	4
SEG-6																							
Mississippi R.	8010100	-001	6.2		U															3			
Mississippi R.	8010100	-002	7.8		U															3			
Mississippi R.	8010100	-003	8.6		U															3			
Mississippi R.	8010100	-004	4.8		U															3			
Mississippi R.	8010100	-005	4.8		U															3			
Mississippi R.	8010100	-007	2.3		U															3			
Mississippi R.	8010100	-008	10.1		U															3			
Mississippi R.	8010100	-009	19.4		U															3			
Mississippi R.	8010100	-010	24.3		U															3			
Mississippi R.	8010100	-011	4.8		U															3			
Mississippi R.	8010100	-012	4.0		U															3			
Mississippi R.	8010100	-013	5.8		U															3			
Mississippi R.	8010100	-017	16.8		U															3			
Mississippi R.	8010100	-018	43.6		U															3			
Mississippi R.	8010100	-034	6.6		U															3			
Mississippi R.	8020100	-001	18.0		U															3			
Mississippi R.	8020100	-002	76.1		U															3			
Mississippi R.	8020100	-003	43.1		U															3			
Mississippi R.	8030100	-003	56.6		U															3			
Mississippi R.	8030100	-005	4.7		U															3			
Mississippi R.	8030100	-006	8.9		U															3			
Mississippi R.	8030100	-007	3.8		U															3			
Mississippi R.	8030100	-009	2.6		U															3			
Mississippi R.	8030100	-011	19.2		U															3			
Mississippi R.	8030100	-012	34.1		U															3			
TOTAL MILES	437.0																						
MILES UNASSESSED	437.0																						
MILES EVALUATED	0.0																						
MILES MONITORED	0.0																						

USE	SUPPORT	NON-SUPPORT
FISH CONSUMPTION	0	0
FISHERIES	0	0
PRIMARY CONTACT	0	0
SECONDARY CONTACT	0	0
DRINKING SUPPLY	0	0
AGRI & INDUSTRY	0	0

Table A-74: Segment 6A, 6B, 6C Active NPDES Permits

Permit Number	Facility Name	Receiving Waters	Reach	USGS H.U.C.	County	Map No.
AR0035751	ARKANSAS CITY, CITY OF	MISSISSIPPI RV	012	8030100	Desha	1
AR0035823	CLEARWATER PAPER CORP.	MISSISSIPPI RV	012	8030100	Desha	2
AR0000388	ENTERGY-RITCHIE PLANT	MISSISSIPPI R (1,2,3)-6B/LONG LK BU(4,5)-4A	002	8020100	Phillips	1
AR0022021	WEST HELENA, CITY OF	MISSISSIPPI RV	002	8020100	Phillips	2
AR0043389	HELENA MUNICIPAL WATER AND SEWER SYSTEM	MISSISSIPPI RV	002	8020100	Phillips	3
AR0000361	KINDER MORGAN OPERATING L.P.	MISSISSIPPI RV (1) & DIT #47 (2)	017	8010100	Mississippi	1
AR0021580	OSCEOLA, CITY OF	MISSISSIPPI RV	010	8010100	Mississippi	2
AR0022039	WEST MEMPHIS, CITY OF	MISSISSIPPI RV	003	8010100	Crittenden	3
AR0022314	WILSON, CITY OF	SLU,ISLAND #35 CHUTE,MISSISSIPPI RV	029	8010100	Mississippi	4
AR0033782	LUXORA, CITY OF	MISSISSIPPI RV	010	8010100	Mississippi	5
AR0036544	VISKASE COMPANIES, INC.	MS RV-6C (1)/BIG SANDY SLU-5A (2,3)	010	8010100	Mississippi	6
AR0037770	BASF CORPORATION	MISSISSIPPI RV	031	8010100	Crittenden	7
AR0043117	NUCOR-YAMATO STEEL	MISSISSIPPI-6C (1,3)/DIT #14A-5A(2)	017	8010100	Mississippi	8
AR0046663	AIR LIQUIDE LARGE INDUSTRIES	DIT,DIT 14A,DIT 13,DIT 31,TYRONZA RV	017	8010100	Mississippi	9
AR0049531	HORSESHOE LAKE WWT FACILITY	MISSISSIPPI RV	003	8010100	Crittenden	10
AR0049557	PLUM POINT ENERGY STATION	MISSISSIPPI RV	010	8010100	Mississippi	11
AR0050083	KINDER-MORGAN BULK TERMINALS-BARFIELD	MISSISSIPPI RV	017	8010100	Mississippi	12
AR0051128	KINDER MORGAN BULK TERMINALS, INC.	MISSISSIPPI R	018	8010100	Mississippi	13

Appendix B AMBIENT GROUNDWATER MONITORING PROGRAM DATA

The following Tables list data specific to each monitoring area sampled during the Federal Fiscal years 1997 through 2006. The tables identify sampling locations for each monitoring area and list descriptive statistics for each monitoring area. Volatile organic compounds and semi-volatile compounds (including pesticides) detected in a particular monitoring area during the referenced period are discussed in Part V of this report. Most of the tables contain spaces occupied by a single dash, which represent unavailable data for that monitoring area. For statistical analyses (mean calculation), a value of one half the detection limit was used in cases where the value is displayed as "less than" the detection limit.

The following abbreviations are used in the Sampling Locations tables:

NA	Not Applicable
S	Spring
W	Well
C/I	Commercial/Industrial
D	Domestic
I	Irrigation
M	Municipal
St	Stock
U	Unused
NT	Not Tested (not analyzed for specified parameter)

The following chemical abbreviations are used in the Selected Descriptive Statistics tables:

TDS	Total Dissolved Solids	Cl	Chloride
HCO_3	Bicarbonate	Fe	Iron
NH_3 -N	Ammonia-Nitrogen	F	Fluoride
NO_3 -N	Nitrate-Nitrogen	K	Potassium
O-Phos	Ortho-Phosphate	Mg	Magnesium
T-Phos	Total Phosphorous	Mn	Manganese
SO_4	Sulfate	Na	Sodium
Ba	Barium	SiO_2	Silica
Ca	Calcium		

LIST OF TABLES FOR APPENDIX B

Table B-1: Brinkley Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
MON103	6/28/2011	03N02W08ABB2	34.89651	-91.23214	-	Alluvial	D
MON116	7/25/2011	03N02W10CCC3	34.88196	-91.20510	160	Alluvial	I
MON121	6/28/2011	03N02W22ACC1	34.86196	-91.19552	65	Alluvial	D
MON122	6/28/2011	03N02W23CDC2	34.85398	-91.18457	100	Alluvial	D
MON182	6/27/2011	-	34.93806	-91.25378	101	Alluvial	M
MON183	6/27/2011	-	34.93797	-91.25117	111	Alluvial	M
MON304	6/27/2011	04N02W14CDC3	34.95497	-91.18169	110	Alluvial	D
MON310	7/11/2011	02N02W14ACB2	34.78990	-91.18100	140	Alluvial	I
MON315	6/27/2011	-	34.92682	-91.20553	120	Alluvial	I
MON318	6/27/2011	-	34.92989	-91.20776	121	Alluvial	I
MON322	8/8/2011	-	34.94011	-91.19303	-	Alluvial	I
MON323	7/12/2011	-	34.75667	-91.17222	-	Alluvial	I
MON324	8/8/2011	02N02W34ACB2	34.74596	-91.20084	-	Alluvial	I
MON325	7/5/2011	02N03W35ADD3	34.74643	-91.28356	-	Alluvial	I
MON326	7/12/2011	02N03W26DDA2	34.75554	-91.28327	-	Alluvial	I
MON327	7/25/2011	-	34.86794	-91.21525	-	Alluvial	I
MON329	7/11/2011	-	34.86666	-91.14872	-	Alluvial	D
MON331	7/11/2011	03N01W33BCC2	34.83130	-91.11760	100	Alluvial	I
MON333	8/8/2011	-	34.78815	91.24224	-	Alluvial	I
MON334	7/25/2011	-	34.82160	-91.22460	-	Alluvial	I
MON335	7/5/2011	02N02W06AAC1	34.82232	-91.24565	-	Alluvial	I
MON900	6/28/2011	-	34.87860	-91.20970	-	Alluvial	I
MON902	7/5/2011	02N02W07DDA4	34.79720	-91.24400	-	Alluvial	I
MON903	7/12/2011	02N02W07DCD4	34.79540	-91.24830	-	Alluvial	I
MON904	7/5/2011	-	34.78780	-91.23330	-	Alluvial	I
MON905	6/27/2011	-	34.94270	-91.21290	-	Alluvial	I
MON906	6/27/2011	04N02W27ABC3	34.93680	-91.19560	-	Alluvial	I
MON907	6/27/2011	-	34.92905	-91.19377	-	Alluvial	I
MON911	7/25/2011	02N02W15BAB2	34.79470	-91.20340	-	Alluvial	I

Table B-2: Brinkley Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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	7.29	940	510	236	288	0.367	<0.03	0.015	0.623	13.5	168	58.2	131	3580	<0.050	1.60	20.1	282	80.3	31.9
MON116	7.07	827	574	388	473	0.477	<0.03	<0.010	0.369	48.8	281	82.9	46.5	2370	<0.050	1.67	35.5	280	32.5	36.2
MON121	7.16	1120	717	418	510	0.735	<0.03	0.016	0.401	71.4	367	102	139	2060	<0.050	2.40	32.3	233	90.6	27.8
MON122	7.13	972	633	414	505	0.849	<0.03	0.010	0.265	64.4	348	112	81.8	2690	<0.05	2.26	34.1	253	40.9	25.9
MON182	7.78	301	189	84	102	0.044	<0.03	0.016	0.210	9.21	129	19.2	32.8	4630	0.200	1.55	7.18	552	22.9	35.5
MON183	7.76	1220	823	284	346	0.798	<0.03	0.409	0.448	<0.20	97.4	7.92	322	180	0.920	2.09	2.38	12.8	279	15.5
MON304	7.09	599	614	375	458	0.476	<0.03	0.122	0.539	136	128	76.3	44.8	945	<0.050	1.11	28.8	588	82.6	26.8
MON310	7.29	1590	1100	423	516	0.711	<0.03	<0.010	0.247	136	424	126	287	3320	0.200	3.08	51.5	379	175	29.3
MON315	7.28	796	745	354	432	0.672	<0.03	0.123	0.422	9.92	206	45.8	237	1080	0.490	3.66	14.4	195	203	25.9
MON318	7.57	813	525	317	387	0.544	<0.03	0.632	0.774	13.8	133	24.8	102	636	1.730	2.69	7.30	82.5	160	19.7
MON322	7.18	533	353	297	362	0.247	<0.03	<0.010	0.260	6.34	153	71.3	16.1	1510	0.250	1.87	21.9	416	23.7	30.6
MON323	7.47	1000	764	410	500	0.743	<0.03	<0.010	0.179	159	369	119	87.9	3240	<0.050	3.23	47.1	473	74.9	37.2
MON324	6.98	694	504	335	409	0.296	<0.03	0.012	0.540	68.0	497	100	21.4	3560	0.250	3.12	30.1	847	23.0	46.0
MON325	7.43	904	648	295	360	0.392	<0.03	0.013	0.232	103	694	112	99.3	5100	<0.050	4.08	35.7	806	34.5	42.2
MON326	7.32	706	442	324	395	0.318	<0.03	0.012	0.376	47.2	655	96.2	35.3	4640	0.260	3.43	29.5	902	22.1	41.9
MON327	7.47	626	448	324	395	0.578	<0.03	0.010	0.465	30.5	209	85.0	32.2	2120	0.270	1.54	27.0	215	25.1	35.1
MON329	6.97	826	655	342	417	0.239	<0.03	<0.010	0.242	137	376	105	68.4	5610	<0.050	0.98	38.9	503	41.8	36.2
MON331	7.16	766	545	399	487	0.089	<0.03	0.321	0.222	75.2	287	95.9	22.2	2570	0.200	1.75	35.5	463	32.3	34.2
MON333	7.07	694	1150	456	556	1.330	<0.03	0.011	0.233	106	1300	160	312	6090	0.180	4.62	52.6	381	170	33.0
MON334	7.21	956	647	399	487	0.865	<0.03	<0.010	0.463	33.4	447	99.4	94	3200	<0.050	2.65	31.0	305	83.0	32.3
MON335	7.26	635	395	267	326	0.533	<0.03	0.017	0.641	41.9	333	75.6	39.4	1740	0.270	1.87	25.6	245	28.5	32.5
MON900	7.12	999	674	460	561	0.632	<0.03	0.015	0.266	96.4	339	107	58.8	3190	<0.050	2.07	36.6	387	47.4	32.7
MON902	7.29	1570	1080	417	509	1.290	<0.03	<0.010	0.323	63.5	815	124	315	4780	0.230	4.55	46.8	356	177	36.2
MON903	6.85	1530	956	415	506	1.220	<0.03	0.013	0.425	53.4	606	101	306	4390	0.220	4.27	36.3	281	193	32.3
MON904	7.37	2100	1620	434	529	1.310	<0.03	<0.010	0.176	37.2	1230	157	619	8140	0.130	5.80	62.8	390	279	38.9
MON905	7.45	439	273	226	276	0.703	<0.03	0.013	0.169	10.1	276	44.7	13.8	1030	0.260	1.86	15.4	89.5	22.5	22.2
MON906	7.32	600	384	327	399	0.397	<0.03	0.020	0.310	10.4	160	61.2	18.6	20.0	0.220	1.83	18.7	336	38.9	26.5
MON907	7.48	971	607	362	442	0.406	<0.03	0.217	0.403	15.8	138	43.4	134	586	<0.050	1.76	13.5	231	151	27.6
MON911	7.19	2120	1380	454	554	1.180	<0.03	<0.010	0.196	48.9	571	138	508	4100	0.140	4.14	60.9	486	212	31.4
Min.	6.85	301	189	84	102	0.044	<0.03	<0.010	0.169	<0.20	97.4	7.92	13.8	20.0	<0.010	0.981	2.38	12.8	22.1	15.5
Max.	7.78	2120	1620	460	561	1.33	<0.03	0.632	0.774	159	1300	160	619	8140	1.73	5.80	62.8	902	279	46.0
Mean	7.28	960	688	353	431	0.635	<0.03	0.071	0.359	56.8	405	88.0	146	3004	0.231	2.67	31.0	378	98.2	31.8

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	33.27906	-91.44211	-	Alluvial	I
CHI002	07/08/97	16S03W34BBB1	33.27075	-9140775	-	Alluvial	D
CHI003	07/08/97	16S03W27ADD1	33.27953	-91.39181	-	Alluvial	D
CHI004	07/07/97	17S03W33BBA1	33.18358	-91.41972	-	Alluvial	I
CHI005	07/08/97	18S03W16CDD1	33.12694	-91.41522	-	Alluvial	I
CHI008	07/08/97	17S03W15DAD1	33.21769	-91.39006	-	Alluvial	I
CHI009	07/07/97	17S03W28ACD1	33.19072	-91.41147	-	Alluvial	I
CHI010	07/07/97	16S02W08DDC1	33.31561	-91.32397	-	Alluvial	I
CHI011	07/07/97	16S03W11ADC1	33.32203	-91.37594	-	Alluvial	I
CHI012	07/07/97	16S03W15CDD1	33.30039	-91.39936	-	Alluvial	I
CHI013	07/07/97	16S03W05BCA1	33.33969	-91.43775	-	Alluvial	I
CHI014	07/07/97	17S03W16BBB1	33.22686	-91.42417	-	Alluvial	I
CHI015	07/07/97	17S03W09AAA1	33.24169	-91.40822	-	Alluvial	I
CHI016	07/07/97	16S03W25CAC1	33.27456	-91.36708	-	Alluvial	I
CHI017	07/08/97	17S03W10AAD1	33.23900	-91.38992	-	Alluvial	I
CHI018	07/08/97	16S03W35CAB1	33.26269	-91.38603	-	Alluvial	I
CHI019	07/08/97	17S03W03AAB1	33.25550	-91.39194	-	Alluvial	I
CHI020	07/08/97	16S03W20BCD1	33.29381	-91.43831	-	Alluvial	I
CHI021	07/08/97	17S03W20AAD1	33.20914	-91.42419	-	Alluvial	I
CHI022	07/08/97	17S03W32BBC1	33.18189	-91.44136	-	Alluvial	I
CHI023	07/08/97	17S03W06DCC1	33.24283	-91.45008	-	Alluvial	I
CHI024	07/08/97	18S03W14BBC1	33.13739	-91.38936	-	Alluvial	I
CHI025	07/08/97	18S03W08DCC1	33.14072	-91.43231	-	Alluvial	I
CHI026	07/08/97	18S03W08AAD1	33.15161	-91.42542	-	Alluvial	I
CHI027	07/08/97	18S03W11CBD1	33.14439	-91.38683	-	Alluvial	I
CHI028	07/08/97	17S03W35CCD1	33.16972	-91.38492	-	Alluvial	I

Table B-4: Chicot Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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	0.550	<0.02	<0.030	0.440	25	624	102	220	4620	0.41	3.90	30.8	284	136	-
CHI002	8.1	1480	1116	248	302	0.961	<0.02	0.247	0.290	8	180	17.2	385	146	0.39	4.50	3.90	22.0	4801	-
CHI003	6.56	1450	922	258	315	1.005	<0.02	0.143	0.170	11	68.3	6.00	380	52.0	0.28	3.30	1.40	6.00	393	-
CHI004	7.17	2080	1334	368	449	0.701	<0.02	<0.030	0.560	45	416	212	460	13200	0.17	6.20	45.4	552	208	-
CHI005	6.95	898	2944	394	481	0.949	<0.02	<0.030	0.490	200	239	320	1230	12700	0.23	6.80	148	2130	473	-
CHI008	7.15	1688	1173	395	482	0.534	<0.02	<0.030	0.850	145	561	129	340	8000	0.34	2.90	54.5	1460	204	-
CHI009	7.08	2970	2064	422	515	0.751	<0.02	<0.030	0.590	161	495	237	890	8010	0.20	7.40	70.6	692	451	-
CHI010	7.16	1264	894	419	511	0.266	<0.02	<0.030	0.260	200	1601	129	82.5	3450	0.21	2.30	49.5	532	101	-
CHI011	7.05	2730	2086	376	459	0.578	<0.02	<0.030	0.320	200	120	278	680	8010	0.19	6.10	99.6	875	238	-
CHI012	7.01	2910	2075	370	451	0.588	<0.02	<0.030	0.480	200	100	247	780	8470	0.19	5.10	88.2	1090	354	-
CHI013	6.91	1410	831	306	373	0.637	<0.02	0.032	0.750	84	781	149	260	14900	0.20	5.10	28.7	902	104	-
CHI014	7.24	1320	815	342	417	0.424	<0.02	<0.030	0.530	34	373	140	250	8130	0.24	3.30	27.4	530	127	-
CHI015	6.99	2920	2043	404	493	1.028	<0.02	<0.030	0.610	189	428	284	840	14200	0.18	3.60	74.0	1400	288	-
CHI016	7.01	2290	1597	334	407	0.728	<0.02	<0.030	0.400	200	320	276	570	6400	0.24	3.20	76.0	1070	183	-
CHI017	7.10	2360	1421	338	412	0.836	<0.02	0.045	0.760	70	668	154	630	9000	0.28	3.60	45.0	1260	244	-
CHI018	7.19	2510	1816	374	456	0.989	<0.02	<0.030	0.440	-	486	270	700	7740	0.20	5.60	77.9	999	286	-
CHI019	7.35	2770	1922	466	568	1.026	<0.02	<0.030	0.610	145	699	207	780	6460	0.28	5.60	62.7	1080	503	-
CHI020	6.97	947	690	336	410	0.573	<0.02	<0.030	0.650	46	724	111	180	6610	0.28	3.50	30.1	248	86.8	-
CHI021	7.13	1072	669	348	424	0.405	<0.02	<0.030	0.520	30	410	109	170	6560	0.23	3.20	25.6	383	89.9	-
CHI022	7.14	671	434	266	324	0.169	<0.02	<0.030	0.310	30	296	84.3	48.5	4710	0.20	2.70	18.6	880	29.4	-
CHI023	7.15	736	445	290	354	0.367	<0.02	<0.030	0.660	17	423	90.3	68.0	5160	0.31	2.40	20.0	532	37.0	-
CHI024	7.07	1406	1115	337	411	0.728	<0.02	<0.030	0.510	177	276	166	320	8020	0.26	3.40	47.2	1060	160	-
CHI025	7.13	1414	1193	350	427	0.431	0.054	<0.030	0.360	90	935	196	390	10500	0.16	5.30	44.3	776	127	-
CHI026	6.76	1884	1693	397	484	0.531	<0.02	0.031	0.260	154	522	239	640	11100	0.16	4.70	56.2	836	244	-
CHI027	7.04	1990	1773	388	473	0.752	<0.02	0.034	0.500	174	333	226	690	8590	0.25	6.10	81.0	688	278	-
CHI028	-	2770	3132	446	544	1.140	<0.02	0.034	0.780	145	1138	313	1460	12200	0.22	8.60	141	1420	621	-
Min.	6.56	671	434	248	302	0.169	<0.02	<0.030	0.170	8	68.3	6.00	48.5	52.0	0.16	2.30	1.40	6.00	29.4	-
Max.	8.10	2970	3132	466	568	1.140	0.054	0.247	0.850	200	1138	320	1460	14900	0.41	8.60	148	2130	621	-
Mean	7.10	1808	1422	359	438	0.680	0.010	0.030	0.500	111	453	180	517	7959	0.24	4.55	55.7	835	248	-

Table B-5: El Dorado Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
UNI008A	6/9/2008	17S15W32BDD1	33.1950	-92.6797	712	El Dorado	C/I
UNI010	6/9/2008	18S15W16ACB1	33.16028	-92.65625	295	Greensand	D
UNI011	6/2/2008	17S16W24BBC1	33.23403	-92.71625	704	El Dorado	M
UNI015	6/3/2008	18S16W01DBC1	33.18389	-92.70708	770	El Dorado	C/I
UNI021	12/1/2008	17S15W16BBA1	33.25042	-92.66236	37	Cockfield	C/I
UNI023	6/9/2008	16S16W34BDD1	33.28931	-92.74389	56	Cockfield	D
UNI024	6/2/2008	17S15W09BBB1	33.26500	-92.66514	550	El Dorado	C/I
UNI025	6/9/2008	18S15W35DAC1	33.10972	-92.61806	770	El Dorado	M
UNI026	6/3/2008	17S14W14DBC1	33.23806	-92.51750	49	Cockfield	D
UNI027	6/10/2008	18S14W07BBA1	33.17694	-92.58778	783	El Dorado	M
UNI028	12/2/2008	17S14W32CBB1	33.19806	-92.57458	120	Cockfield	D
UNI029	6/9/2008	16S16W34BDD2	33.28875	-92.74542	300	Greensand	D
UNI061	12/1/2008	18S15W21DAC1	33.13972	-92.65222	40	Cockfield	D
UNI063	6/10/2008	18S15W20BDC1	33.14361	-92.67903	320	Greensand	D
UNI094	12/1/2008	18S16W02AAA1	33.19319	-92.71792	43	Cockfield	D
UNI099	12/2/2008	18S16W11CDD1	33.16486	-92.72694	70	Cockfield	D
UNI117	6/2/2008	-	33.24111	-92.67500	700	El Dorado	M
UNI118A	6/2/2008	-	33.2076	-92.6603	746	El Dorado	M
UNI119	6/3/2008	17S15W22CCD1	33.22306	-92.64528	346	Greensand	D
UNI120	6/10/2008	18S15W27AAB	33.13528	-92.63583	662	El Dorado	C/I
UNI121	6/9/2008	18S15W21DAC2	33.13944	-92.65250	310	Greensand	D
UNI122B	6/3/2008	-	-	-	-	-	-
UNI900	6/2/2008	-	33.2373	-92.6273	528	El Dorado	M
UNI901	6/2/2008	-	33.2574	-92.6635	-	El Dorado	C/I

Table B-6: El Dorado Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
UNI008A	8.46	703	390	209	255	0.610	<0.010	0.170	0.244	22.1	17.4	2.21	81.7	21.7	0.34	1.24	0.380	5.43	145	11.50
UNI010	8.17	288	163	153	187	0.703	<0.010	0.102	0.139	3.22	69.3	9.44	2.08	37.4	0.09	2.26	1.93	21.3	49.9	11.80
UNI011	8.59	427	249	201	245	0.420	0.013	0.251	0.306	0.22	6.42	0.802	22.4	<20.0	0.29	0.870	0.133	6.03	96.4	11.70
UNI015	8.52	580	333	207	253	0.547	0.011	0.190	0.244	29.5	15.5	1.91	41.3	<20.0	0.33	1.15	0.350	5.37	118	10.40
UNI021	5.26	104	87	16.6	20.2	<0.030	0.255	0.019	0.115	14.6	87.9	4.54	6.35	27.1	0.13	2.90	2.32	14.1	8.43	34.00
UNI023	5.68	126	113	31.7	38.7	<0.030	<0.010	0.015	0.278	4.55	53.5	5.74	12.1	3490	0.23	2.83	2.29	81.7	8.25	46.30
UNI024	8.59	457	260	207	253	0.453	0.010	0.176	0.229	0.30	9.12	1.53	27.2	23.7	0.21	0.960	0.190	9.94	101	11.10
UNI025	8.89	734	397	192	234	0.576	<0.010	0.243	0.295	4.80	9.76	1.18	97.9	<20.0	0.34	0.930	0.150	1.30	152	12.10
UNI026	5.09	56	76	19.8	24.2	<0.030	0.434	0.014	0.132	2.43	31.1	4.27	3.36	1150	0.10	0.910	0.620	6.86	3.76	36.90
UNI027	8.11	817	432	196	239	0.531	<0.010	0.160	0.217	42.2	41.6	4.05	86.0	351	0.34	1.10	0.440	462	156	12.10
UNI028	5.31	194	<1.0	22.3	27.2	0.050	<0.010	0.162	0.369	4.54	100	6.91	32.8	1270	0.22	2.38	2.80	43.6	19.3	63.90
UNI029	8.03	325	191	178	217	0.488	<0.010	0.047	0.105	0.96	107	14.1	2.07	88.9	0.13	2.29	2.92	23.4	50.5	14.90
UNI061	6.27	94	2.5	34.2	41.7	<0.030	0.256	0.006	0.048	2.72	41.9	13.9	2.48	41.9	0.13	0.698	0.330	2.40	2.48	19.80
UNI063	8.06	281	165	146	178	0.920	<0.010	0.172	0.220	3.06	60.2	7.87	2.59	49.2	0.10	2.49	1.76	19.8	50.9	12.30
UNI094	6.20	213	1.5	65.3	79.7	<0.030	0.405	0.162	0.323	19.1	30.4	19.7	7.90	<20.0	0.13	1.31	0.980	11.4	17.4	64.50
UNI099	7.83	186	89.5	25.8	31.5	1.430	7.300	<0.005	<0.010	0.28	144	11.5	13.3	1520	0.04	3.31	4.80	163	6.42	9.20
UNI117	8.53	487	280	205	250	0.511	<0.010	0.225	0.286	0.26	18.7	2.13	35.2	<20.0	0.28	1.18	0.480	8.45	104	11.20
UNI118A	8.46	689	374	201	245	0.609	0.010	0.197	0.250	1.29	22.4	2.93	95.5	<40.0	0.34	1.41	0.550	5.82	138	11.20
UNI119	8.18	299	179	159	194	0.733	0.012	0.180	0.220	3.59	60.0	7.31	2.42	33.9	0.09	2.46	1.74	16.9	53.4	11.10
UNI120	8.77	662	371	187	228	0.557	<0.010	0.204	0.252	24.8	8.16	0.950	67.0	<20.0	0.30	1.00	0.160	1.34	141	11.70
UNI121	8.17	311	181	163	199	0.793	<0.010	0.293	0.358	1.80	94.8	11.9	4.75	27.5	0.06	2.90	2.57	20.6	51.0	15.30
UNI122B	8.60	474	264	192	234	0.446	0.011	0.219	0.277	2.03	9.89	1.13	34.9	<20.0	0.32	1.02	0.230	9.00	98.7	10.50
UNI900	8.59	506	282	200	244	0.491	0.028	0.227	0.273	0.25	7.81	0.880	45.0	<20.0	0.36	1.02	0.190	3.21	109	11.30
UNI901	8.46	434	249	198	242	0.486	0.011	0.165	0.233	0.44	19.1	2.55	23.0	73.0	0.22	1.25	0.520	12.1	91.9	10.90
Min.	5.09	56	<1.0	16.6	20.2	<0.030	<0.010	<0.005	<0.010	0.22	6.42	0.802	2.07	<20.0	0.04	0.698	0.133	1.30	2.48	9.20
Max.	8.89	817	432	209	255	1.43	7.30	0.293	0.369	42.2	144	19.7	97.9	3490	0.36	3.31	4.80	462	156	64.5
Mean	7.70	394	214	142	173	0.476	0.367	0.150	0.226	7.88	44.4	5.81	31.2	346	0.21	1.66	1.20	39.8	73.9	19.8

Table B-7: Hardy Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
FUL001	5/6/2008	19N06W30BBC1	36.27956	-91.67233	368	Cotter	D
FUL002	5/19/2008	19N07W36AAB1	36.26767	-91.67772	1050	Roubidoux	M
FUL004	5/19/2008	21N07W35DAA1	36.43469	-91.69192	-	-	D
FUL005	7/8/2008	21N06W12ACD1	36.49181	-91.56944	220	Cotter-Jefferson City	D
FUL007	5/5/2008	19N06W36CCD1	36.25125	-91.58072	160	Cotter-Jefferson City	D
FUL010	5/19/2008	21N06W18CBD1	36.47628	-91.66867	760	Roubidoux	D
FUL011A	5/19/2008	-	-	-	-	-	M
SHA001	5/5/2008	17N06W23BCC1	36.11003	-91.60350	1045	Cotter-Jefferson City	D
SHA002	5/6/2008	18N07W01DCD1	36.23978	-91.67978	-	-	D
SHA003	5/6/2008	18N07W01CBB1	36.24433	-91.69117	263	Cotter	D
SHA004A	5/6/2008	-	36.2408	-91.6522	368	Cotter	D
SHA005	5/5/2008	18N05W19BBA1	36.20586	-91.56228	563	Cotter-Jefferson City	D
SHA006	5/6/2008	19N05W11BDB1	36.31639	-91.48592	1180	Roubidoux	M
SHA008	5/6/2008	19N05W22CBC1	36.28361	-91.51006	368	Cotter-Jefferson City	C/I
SHA009	5/20/2008	20N04W05ABA1	36.42142	-91.42122	685	Roubidoux	D
SHA010	5/20/2008	21N04W33ACC1	36.43094	-91.40639	158	Cotter	M
SHA011	5/20/2008	20N04W23BAA1	36.37650	-91.37392	785	Cotter	D
SHA012	5/20/2008	19N03W05DCC1	36.31900	-91.31994	830	Roubidoux	D
SHA013	5/20/2008	20N03W29ADB1	36.35611	-91.31450	-	-	D
SHA014	5/5/2008	19N04W26CCB1	36.26253	-91.38314	188	Cotter	D
SHA016	5/5/2008	18N04W28BBB1	36.18764	-91.42289	-	Cotter	D
SHA017	5/5/2008	-	36.08636	-91.65636	1200	-	D
SHA056	5/6/2008	-	36.32106	-91.48389	150	Roubidoux	M
SHA098	5/5/2008	-	36.2627	-91.3959	NA	Cotter	S
SHA099	5/20/2008	-	36.4215	-91.4261	NA	Cotter	S
SHA150	5/5/2008	-	-	-	-	-	D

Table B-8: Hardy Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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	7.42	447	247	226	276	<0.030	0.696	0.007	0.025	3.79	17.5	47.9	2.51	<20.0	0.11	0.670	26.5	<0.300	1.78	9.80
FUL002	7.40	-	247	232	283	<0.030	0.232	0.013	0.038	3.94	21.8	49.5	2.59	<20.0	0.06	1.06	27.8	<0.300	1.58	9.84
FUL004	6.95	-	455	373	455	<0.030	2.23	0.013	0.037	2.41	40.8	87.2	46.0	<20.0	0.05	0.800	51.1	0.370	7.01	13.2
FUL005	6.94	-	347	347	423	<0.030	0.820	0.016	0.018	4.09	32.6	75.6	8.31	<20.0	0.06	1.22	42.2	0.530	2.65	13.9
FUL007	7.46	444	246	216	264	<0.030	2.05	0.008	0.026	0.85	23.1	47.3	3.07	<20.0	0.06	0.510	26.0	<0.300	1.07	10.9
FUL010	6.87	-	437	429	523	<0.030	0.931	0.013	0.031	2.75	33.0	90.1	3.08	<20.0	0.05	0.810	52.5	1.15	1.14	14.4
FUL011A	6.95	-	373	361	440	<0.030	2.26	0.014	0.049	3.93	27.2	79.0	7.64	<20.0	0.04	0.970	43.1	<0.300	1.92	13.5
SHA001	7.15	472	258	244	298	<0.030	0.497	0.010	0.033	4.33	22.7	52.8	6.81	<20.0	0.08	0.860	27.4	<0.300	2.24	12.9
SHA002	7.29	527	288	284	346	<0.030	1.04	0.006	0.026	6.10	15.0	57.0	3.29	<20.0	0.09	0.930	31.1	<0.300	1.27	10.0
SHA003	7.27	486	269	248	303	<0.030	1.22	0.008	0.034	5.53	28.2	50.6	8.97	<20.0	0.09	0.650	28.5	<0.300	2.60	11.1
SHA004A	6.70	361	210	192	234	<0.030	0.604	0.007	0.041	3.71	14.4	36.7	5.69	<20.0	0.07	0.780	20.2	0.640	3.29	13.2
SHA005	6.92	687	367	349	426	<0.030	2.40	0.008	0.026	4.17	26.9	75.0	12.0	<20.0	0.07	0.810	41.1	<0.300	2.88	12.2
SHA006	7.05	668	362	356	434	<0.030	0.036	<0.005	0.022	10.8	33.3	72.3	2.14	<20.0	0.06	1.30	42.3	<0.300	1.55	10.7
SHA008	7.10	636	338	276	337	<0.030	1.45	0.007	0.024	6.12	34.5	64.4	36.5	<20.0	0.06	0.940	35.0	0.530	8.53	11.1
SHA009	7.10	-	170	158	193	<0.030	0.103	0.014	0.040	4.50	21.3	32.9	4.50	<20.0	0.06	0.560	17.6	<0.300	1.57	11.9
SHA010	7.54	-	189	158	193	<0.030	0.891	0.019	0.055	2.24	19.5	34.3	15.2	<20.0	0.06	0.890	20.0	1.45	4.25	9.55
SHA011	7.30	-	260	271	331	<0.030	0.163	0.012	0.035	3.91	25.7	55.6	4.35	<20.0	0.07	0.460	30.5	<0.300	1.85	11.4
SHA012	7.24	-	282	243	296	<0.030	1.79	0.012	0.040	9.61	21.4	56.5	5.37	<20.0	0.04	1.27	30.5	<0.300	1.75	12.5
SHA013	7.14	-	371	377	460	<0.030	0.605	0.011	0.020	6.32	24.9	78.9	3.08	<20.0	0.04	0.700	44.6	<0.300	0.860	8.98
SHA014	6.75	404	229	204	249	<0.030	0.154	0.007	0.037	3.66	16.6	43.5	2.64	<20.0	0.06	0.470	24.4	0.380	1.82	12.3
SHA016	7.22	568	312	287	350	<0.030	0.440	0.007	0.016	7.02	21.4	62.4	2.86	<20.0	0.09	0.800	35.5	<0.300	1.38	8.89
SHA017	6.93	701	377	361	440	<0.030	0.110	<0.005	0.018	13.8	30.6	75.7	3.00	<20.0	0.11	2.34	42.7	2.61	1.61	11.2
SHA056	7.10	670	363	355	433	<0.030	0.147	<0.005	0.018	9.34	29.9	72.7	2.38	<20.0	0.06	1.33	42.1	0.600	1.47	11.0
SHA098	7.22	489	269	269	328	<0.030	0.136	0.009	0.030	3.03	22.1	53.4	2.05	<20.0	0.06	0.760	29.6	<0.300	1.42	11.6
SHA099	6.73	-	135	115	140	<0.030	0.351	0.013	0.030	4.26	29.5	24.0	6.11	<20.0	0.04	0.730	14.4	<0.300	2.19	10.1
SHA150	7.31	424	281	261	318	<0.030	0.621	0.008	0.021	1.98	28.9	55.3	16.0	<20.0	0.03	0.800	30.6	<0.300	3.13	9.85
Min.	6.70	361	135	115	140	<0.030	0.036	<0.005	0.016	0.85	14.4	24.0	2.05	<20.0	0.03	0.460	14.4	<0.300	0.856	8.89
Max.	7.54	701	455	429	523	<0.030	2.40	0.019	0.055	13.8	40.8	90.1	46.0	<20.0	0.11	2.34	52.5	2.61	8.53	14.4
Mean	7.12	532	295	277	337	<0.030	0.845	0.010	0.030	5.08	25.5	58.9	8.31	<20.0	0.06	0.90	33.0	0.416	2.42	11.4

Table B-9: Jonesboro Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
CRA002A	8/10/2009	14N04E07ABA1	-	-	70	Alluvial	D
CRA005	8/10/2009	14N04E07CDC2	35.852333	-90.708250	180	Memphis	M
CRA010	8/18/2009	13N04E09DCD1	35.764611	90.666139	105	Alluvial	I
CRA014	8/10/2009	14N04E22CBD1	35.824694	90.655806	350	Memphis	M
CRA015	8/10/2009	14N04E32BCA1	35.802889	-90.691889	342	Memphis	M
CRA017	8/10/2009	14N04E28DAB1	35.813722	-90.663750	362	Memphis	M
CRA038	8/17/2009	14N02E23CDD1	35.823139	-90.850111	97	Alluvial	I
CRA039	8/17/2009	14N03E14CAA1	35.841750	-90.739639	173	Alluvial	I
CRA044	8/11/2009	13N05E21BAA1	35.749306	-90.561806	871	Wilcox	M
CRA045	8/11/2009	15N03E29BBB1	35.907917	-90.800361	160	Alluvial	M
CRA046	8/11/2009	15N05E29DBB1	35.899972	-90.575861	170	-	M
CRA048	8/10/2009	14N02E14BDA1	35.847667	-90.847083	140	Alluvial	I
CRA050	8/18/2009	-	35.770417	-90.643111	-	Alluvial	I
CRA900	8/17/2009	-	35.795600	-90.809400	130	Alluvial	I
CRA902	8/17/2009	-	35.724600	-90.625600	-	-	I
CRA903	8/11/2009	-	35.843300	-90.578000	-	-	-
PON019	8/18/2009	12N03E12BBC1	35.690250	-90.729806	160	Alluvial	I

Table B-10: Jonesboro Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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
CRA002A	6.04	255	178	61.2	74.7	<0.030	2.17	0.089	0.089	11.1	47.2	19.9	35.0	<20.0	0.14	0.664	8.58	0.960	17.1	28.9
CRA005	6.16	181	159	69.0	84.2	<0.030	1.45	0.034	0.080	19.1	22.5	17.5	17.2	<20.0	0.13	0.601	7.82	0.880	16.2	26.3
CRA010	6.86	413	277	158	193	<0.030	0.274	0.068	0.127	44.2	74.9	37.4	14.4	<20.0	0.19	1.21	16.3	1.76	25.5	28.6
CRA014	5.96	152	112	50.7	61.9	<0.030	0.506	0.028	0.072	6.16	32.1	11.8	15.0	106	0.11	0.686	5.03	3.97	11.7	23.3
CRA015	5.99	161	119	54.7	66.7	<0.030	0.768	0.030	0.081	5.17	26.0	11.8	15.4	87.3	0.11	0.738	5.15	2.67	13.2	25.9
CRA017	6.07	178	126	68.0	83.0	<0.030	0.324	0.040	0.080	8.05	30.8	14.2	12.6	<20.0	0.13	0.801	6.29	6.90	14.0	25.4
CRA038	6.79	1301	1110	285	348	0.149	<0.010	0.021	0.112	227	100	157	194	6130	<0.01	1.98	37.5	1260	72.9	36.3
CRA039	6.64	258	173	109	133	<0.030	0.514	0.057	0.106	5.84	32.0	24.2	16.5	35.9	0.16	0.570	10.8	1.87	13.5	26.6
CRA044	7.85	328	217	195	238	0.378	<0.010	0.214	0.254	0.130	12.8	1.10	3.02	105	0.19	1.89	0.353	12.3	87.4	11.0
CRA045	6.01	130	113	42.3	51.6	<0.030	0.474	0.068	0.140	6.74	26.3	10.0	12.8	<20.0	0.14	0.990	3.21	2.54	11.9	34.9
CRA046	5.75	99	84	32.0	39.0	<0.030	0.416	0.023	0.072	1.98	32.6	6.39	10.5	<20.0	0.11	0.698	2.92	1.50	8.94	26.0
CRA048	6.96	576	393	244	298	0.046	<0.010	0.027	0.270	51.7	99.1	71.5	22.3	4960	0.23	1.12	19.0	935	23.5	43.9
CRA050	6.88	792	533	337	411	<0.030	<0.010	0.019	0.113	83.4	121	88.6	25.1	795	0.13	1.59	24.9	783	55.4	31.2
CRA900	6.40	226	169	79.5	97.0	<0.030	1.54	0.034	0.076	10.9	42.0	15.0	23.2	25.0	0.15	0.701	5.63	1.28	19.2	21.5
CRA902	6.95	975	646	416	508	0.184	<0.010	0.017	0.141	103	420	121	16.5	4170	0.17	1.96	36.8	214	51.3	27.6
CRA903	6.81	727	491	335	409	0.095	<0.010	0.029	0.209	58.6	151	89.9	19.7	6940	0.15	1.72	26.7	659	37.0	36.4
PON019	7.10	992	691	325	397	0.082	<0.010	0.026	0.106	134	215	141	51.8	5530	0.10	1.12	38.1	417	18.5	32.3
Min.	5.75	99	84	32.0	39.0	<0.030	<0.010	0.017	0.072	0.130	12.8	1.10	3.02	<20.0	<0.01	0.570	0.353	0.880	8.94	11.0
Max.	7.85	1301	1110	416	508	0.378	2.17	0.214	0.270	227	420	157	194	6940	0.23	1.98	38.1	1260	87.4	43.9
Mean	6.54	456	329	168	205	0.065	0.498	0.048	0.125	45.7	87.4	49.3	29.7	1703	0.14	1.12	15.0	253	29.2	28.6

Table B-11: Lonoke Monitoring Area Sampling Locations

Station ID	Collect Date	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
LON003A	7/29/2010	34.849910	-91.894343	160	Alluvial	
LON009A	7/22/2010	34.831915	-91.944685	153	Alluvial	I
LON010	7/29/2010	34.829398	-91.894605	128	Alluvial	I
LON017	6/21/2010	34.759054	-91.878788	250	Alluvial	I
LON017R	6/21/2010	34.755065	-91.896146	195	Alluvial	I
LON021	6/22/2010	34.705279	-91.989153	100	Alluvial	I
LON021A	7/12/2010	34.705325	-91.984530			I
LON022A	6/22/2010	34.762048	-91.952181	360	Sparta	Fish Farm
LON024	6/21/2010	34.715759	-91.875622	210	Alluvial	I
LON040	6/22/2010	34.687064	-91.976893		Alluvial	Fish Farm
LON041	6/22/2010	34.683572	-91.983064			Fish Farm
LON042	6/22/2010	34.705386	-91.967180			I
LON900	6/21/2010	34.849381	-91.882065			USGS
LON901	6/21/2010	34.783151	-91.878470	437	Sparta	M
LON903	6/22/2010	34.697182	-91.935416			I
LONWW004	6/21/2010	34.780802	-91.878464	439	Sparta	M

Table B-12: Lonoke Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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	6.21	81	139	54	66	0.056	<0.010	0.014	0.259	9.70	115	12.2	10.5	5330	0.13	0.946	3.98	1470	11.6	38.9
LON009A	6.14	149	210	86	104	0.032	<0.010	0.015	0.232	31.1	218	26.4	17.1	2350	0.14	1.02	8.40	430	13.7	31.7
LON010	6.06	245	245	109	133	0.115	<0.010	0.024	0.169	17.1	218	34.5	34.1	6430	0.13	1.06	9.88	1550	16.9	31.7
LON017	6.77	572	316	222	271	0.101	<0.010	0.012	0.284	43.9	341	72.3	9.98	3220	0.21	1.16	18.3	251	15.5	25.6
LON017R	5.55	684	382	234	285	0.239	<0.010	0.025	0.211	46.3	372	87.6	27.9	4450	0.19	1.27	19.4	769	17.8	28.0
LON021	6.05	808	476	291	355	0.394	<0.010	0.040	0.569	70.5	684	110	24.2	10400	0.18	1.40	19.6	536	23.3	22.6
LON021A	6.80	449	475	271	331	0.437	<0.010	0.034	0.410	50.8	468	101	38.3	10600	0.15	1.33	20.1	716	30.1	23.5
LON022A	6.97	396	209	192	234	0.174	<0.010	0.017	0.223	2.97	321	41.4	7.66	4220	0.17	1.87	11.0	243	21.5	14.5
LON024	7.04	672	373	262	320	0.405	<0.010	0.010	0.257	29.2	479	82.2	21.9	2490	0.20	1.53	17.0	418	28.5	25.2
LON040	6.39	833	440	221	270	0.894	0.041	0.128	0.229	48.7	520	78.4	51.7	25700	0.24	1.61	20.3	633	37.9	21.0
LON041	6.47	783	441	211	257	0.800	0.019	0.145	0.188	46.8	891	77.6	55.3	30000	0.22	2.34	21.5	613	33.0	20.6
LON042	6.15	807	472	282	344	0.430	<0.010	0.052	0.537	61.7	572	109	31.5	10600	0.18	1.36	19.5	632	26.5	22.4
LON900	6.31	306	175	74.5	91	0.116	<0.010	0.028	0.248	29.4	123	19.7	16.8	1490	0.18	0.955	6.66	2350	14.1	38.3
LON901	6.26	438	194	184	224	0.257	<0.010	0.022	0.224	6.58	250	29.7	14.9	4430	0.16	2.18	8.27	316	45.3	13.7
LON903	5.96	775	489	213	260	0.465	0.041	0.075	0.260	132	241	107	9.98	19800	0.20	1.53	19.1	636	13.5	25.9
LONWW004	5.62	539	249	193	235	0.287	<0.010	0.030	0.199	7.49	343	42.6	19.1	6090	0.15	2.46	11.7	441	45.2	13.3
Min.	5.55	81	139	54	66	0.032	<0.010	0.010	0.169	2.97	115	12.2	7.66	1490	0.13	0.946	3.98	243	11.6	13.3
Max.	7.04	833	489	291	355	0.894	0.041	0.145	0.569	132	891	110	55.3	30000	0.24	2.46	21.5	2350	45.3	38.9
Mean	6.30	534	330	194	236	0.325	0.010	0.042	0.281	39.6	385	64.5	24.4	9225	0.18	1.50	14.7	750	24.7	24.8

Table B-13: Omaha Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
BNE002	5/3/2010	19N21W14CDA1	36.29895	-93.18508	spring	Springfield Plateau	S
BNE003	5/3/2010	19N22W12CAB1	36.31665	-93.27329	spring	Springfield Plateau	S
BNE005A	5/3/2010	19N21W05DDB1	36.32739	-93.22815	spring	Springfield Plateau	S
BNE007	5/11/2010	19N21W31ACB1	36.38380	-93.20836	spring	Springfield Plateau	S
BNE012	5/10/2010	21N20W29ACD1	36.44658	-93.12579	spring	Springfield Plateau	S
BNE017	5/4/2010	21N21W09BAD1	36.49606	-93.21242	spring	Springfield Plateau	S
BNE023	5/4/2010	20N21W33ACA1	36.37544	-93.24135	565	Ozark	D
BNE024	5/4/2010	20N22W13CBD1	36.38895	-93.27343	460	Ozark	D
BNE025	5/11/2010	20N21W15CAD1	36.38856	-93.19758	455	Ozark	D
BNE027	5/11/2010	-	36.40944	-93.09833	240	Ozark	D
BNE028	5/4/2010	20N22W03DDA1	36.41688	-93.29770	400	Ozark	D
BNE029	5/10/2010	21N21W26ADA1	36.44814	-93.17001	675	Ozark	D
BNE030A	5/10/2010	21N20W23CDD1	36.45200	-93.07660	225	Ozark	D
BNE032	5/4/2010	21N21W15BDA1	36.47859	-93.19681	705	Ozark	D
BNE033	5/4/2010	21N22W12DCC1	36.48649	-93.26756	550	Ozark	D
BNE036	5/10/2010	21N21W22DDA1	36.45652	-93.18890	1340	Ozark	M
BNE037	5/3/2010	19N21W20BDC1	36.28954	-93.23745	450	Ozark	D
BNE040	5/3/2010	20N21W31ABC1	36.35139	-93.24944	~160	Springfield Plateau	D
BNE040A	5/3/2010	-	36.351714	-93.253153	340	Ozark	D
BNE041	5/3/2010	-	36.349408	-93.250909	spring	Springfield Plateau	S
BNE042	5/11/2010	20N20W09AAA1	36.40637	-93.10472	spring	Springfield Plateau	S
BNE044	5/4/2010	21N21W09ABB1	36.49811	-93.21200	spring	Springfield Plateau	S
BNE046	5/10/2010	20N19W23CDC3	36.45140	-93.07933	248	Ozark	D
BNE047	5/10/2010	20N20W02DBA3	36.41681	-93.17595	375	Ozark	D
BNE048	5/11/2010	20N19W10BCA2	36.40267	-93.09844	~465	Ozark	D
BNE050	5/11/2010	19N20W20BCC2	36.37401	-93.13561	550	Ozark	D
BNE100	5/11/2010	-	36.489708	-93.269913	550	Ozark	D
BNE500	5/3/2010	-	36.350716	-93.251133	spring	Springfield Plateau	S

Table B-14a: Omaha Monitoring Area Selected Descriptive Statistics: Springfield Plateau Aquifer

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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	7.17	404	242	185	226	<0.030	1.53	0.016	0.050	7.70	35.3	73.1	9.99	<20.0	0.08	1.24	1.75	0.450	4.40	9.53
BNE003	7.08	483	292	208	254	<0.030	2.03	0.019	0.046	10.5	48.3	91.1	9.90	<20.0	0.08	1.83	1.81	<0.30	4.64	10.1
BNE005A	5.85	407	249	191	233	<0.030	1.50	0.020	0.053	5.75	38.8	76.3	9.00	<20.0	0.07	1.38	1.35	<0.30	3.39	10.1
BNE007	7.45	434	265	177	216	<0.030	2.91	0.040	0.070	11.4	43.5	80.5	15.5	<20.0	0.07	1.70	1.97	<0.30	7.48	10.1
BNE012	7.92	303	203	112	137	<0.030	6.70	0.020	0.045	8.16	30.4	53.1	4.30	<20.0	0.07	2.21	2.97	0.420	2.86	11.2
BNE017	5.29	283	180	94	115	<0.030	2.17	0.016	0.046	3.39	47.9	39.9	23.1	<20.0	0.07	1.37	2.52	0.480	9.74	9.38
BNE040	6.60	467	295	204	249	<0.030	3.62	0.018	0.064	3.56	39.5	87.5	12.8	<20.0	0.05	1.01	1.74	<0.30	3.08	11.1
BNE041	7.17	393	240	183	223	<0.030	2.27	0.027	0.065	4.16	35.8	73.2	9.20	<20.0	0.06	1.73	1.32	0.350	3.27	9.92
BNE042	6.87	611	328	318	388	<0.030	1.84	0.006	0.043	5.39	36.4	68.7	6.40	<20.0	0.10	1.48	42.7	2.38	2.15	12.1
BNE044	7.96	247	153	70	86	<0.030	1.13	0.025	0.048	7.34	53.3	26.3	26.1	<20.0	0.10	1.43	3.29	<0.30	15.10	6.92
BNE500	6.76	401	244	186	227	<0.030	2.58	0.014	0.046	4.48	37.1	75.4	7.49	<20.0	0.06	1.24	1.39	<0.30	2.79	10.0
Min.	5.29	247	153	70	86	<0.030	1.13	0.006	0.043	3.39	30.4	26.3	4.30	<20.0	0.05	1.01	1.32	<0.30	2.15	6.92
Max.	7.96	611	328	318	388	<0.030	6.70	0.040	0.070	11.4	53.3	91.1	26.1	<20.0	0.10	2.21	42.7	2.38	15.1	12.1
Mean	6.92	403	244	175	214	<0.030	2.57	0.020	0.050	6.53	40.6	67.7	12.2	<20.0	0.07	1.51	5.71	0.45	5.35	10.0

Table B-14b continued: Omaha Monitoring Area Selected Descriptive Statistics: Ozark Aquifer

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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	7.20	167	101	61.6	75.2	0.320	0.287	<0.005	<0.010	13.8	21.5	25.8	6.92	<20.00	0.07	1.76	2.23	0.39	2.57	1.99
BNE024	6.96	538	310	251	306	<0.030	0.035	<0.005	0.019	19.4	11.8	61.6	5.05	<20.00	0.33	1.78	31.0	<0.30	4.06	7.93
BNE025	7.36	560	341	179	218	<0.030	4.60	<0.005	0.015	46.7	23.2	75.8	40.2	<20.00	0.14	1.69	23.2	0.58	8.46	10.4
BNE027	7.23	567	321	281	343	<0.030	0.767	<0.005	0.019	12.9	30.1	62.6	4.31	<20.00	0.13	0.92	39.6	<0.30	3.21	12.1
BNE028	6.86	575	354	218	266	<0.030	8.30	0.009	0.040	10.1	30.5	94.5	20.7	<20.00	0.40	1.88	9.28	1.25	7.40	10.4
BNE029	7.38	594	348	259	316	<0.030	0.620	<0.005	<0.010	54.2	33.8	82.3	3.77	<20.00	0.22	2.91	32.3	2.73	2.10	9.45
BNE030A	7.48	559	315	266	324	<0.030	0.610	<0.005	<0.010	26.4	12.6	63.4	2.69	<20.00	0.19	2.71	36.0	1.67	1.73	8.68
BNE032	5.47	343	212	142	173	<0.030	0.016	<0.005	0.022	41.4	15.9	36.9	1.12	34.6	0.37	2.19	19.1	1.68	1.08	8.09
BNE033	6.50	348	198	168	205	<0.030	0.577	<0.005	0.022	16.2	10.7	37.9	3.63	<20.00	0.13	1.05	20.0	0.44	1.57	9.48
BNE036	7.96	341	192	169	206	<0.030	<0.010	<0.005	0.011	15.8	3.45	41.1	1.54	29.4	0.18	1.45	20.3	1.15	1.44	9.62
BNE037	7.51	534	320	230	281	<0.030	0.915	<0.005	0.020	34.3	21.6	80.3	7.53	<20.00	0.44	0.90	15.9	0.65	7.30	8.85
BNE040A	6.93	390	226	187	228	0.251	<0.010	<0.005	0.019	21.9	16.0	36.4	2.81	<20.00	0.91	5.28	18.5	1.32	12.1	8.10
BNE046	7.19	562	316	285	348	<0.030	0.042	<0.005	<0.010	19.3	6.72	66.2	1.84	<20.00	0.42	3.73	36.7	0.60	1.57	9.04
BNE047	7.34	775	503	273	333	<0.030	0.071	<0.005	<0.010	138	20.7	95.9	1.86	<20.00	0.41	5.51	49.2	0.39	2.46	8.75
BNE048	7.01	535	305	272	332	<0.030	1.130	<0.005	<0.010	8.7	23.0	59.9	3.44	<20.00	0.09	1.43	35.4	1.55	4.01	7.80
BNE050	7.28	528	317	250	305	<0.030	0.078	<0.005	0.012	30.6	17.1	69.7	1.46	<20.00	0.09	1.27	31.4	<0.30	1.52	10.7
BNE100	7.70	297	176	133	162	<0.030	2.100	0.091	0.135	8.6	34.3	46.5	4.77	<20.00	0.12	1.37	7.80	5.87	3.55	11.4
Min.	5.47	167	101	61.6	75.2	<0.030	<0.010	<0.005	<0.010	8.6	3.45	25.8	1.12	<20.0	0.07	0.90	2.23	<0.30	1.08	1.99
Max.	7.96	775	503	285	348	0.32	8.30	0.091	0.135	138	34.3	95.9	40.2	34.6	0.91	5.51	49.2	5.87	12.1	12.1
Mean	7.14	483	285	213	260	0.17	1.19	0.01	0.02	30.5	19.6	60.9	6.68	12.6	0.27	2.22	25.2	1.22	3.89	8.99

Table B-15: Ouachita Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
OUA005	6/2/2009	12S19W13BCB1	33.6951	-93.0184	60	Cane River	M
OUA017	6/2/2009	13S19W28BCD1	33.57578	-93.07136	52	Sparta	D
OUA024	6/1/2009	14S18W27BDC1	33.48786	-92.95183	55	Sparta	M
OUA030	6/1/2009	15S19W10DCC1	33.43833	-93.05511	370	Sparta	M
OUA031	6/1/2009	15S19W22CCC1	33.41028	-93.06397	375	Sparta/Cane River	M
OUA034	6/1/2009	15S19W33BDB1	33.3904	-93.0787	295	Sparta/Cane River	M
OUA036	6/2/2009	14S17W30ACD1	33.48617	-92.89319	52	Sparta	M
OUA037	6/2/2009	14S17W08CDA1	33.52442	-92.87867	-	-	M
OUA041	6/1/2009	14S18W28CAB1	33.48786	-92.96839	10	Sparta	S
OUA048	6/2/2009	-	33.53503	-92.92471	60	-	D
OUA900	6/2/2009	-	33.47086	-92.88165	42	-	D
OUA901	6/2/2009	-	33.54299	-92.96643	130	-	D

Table B-16: Ouachita Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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	4.46	44	31	7	9	<0.030	0.171	<0.005	0.020	4.29	30.0	1.04	2.25	<20.0	0.06	1.09	0.720	8.29	2.25	9.01
OUA017	4.70	59	42	8	9	<0.030	0.095	<0.005	0.030	5.33	36.6	2.43	4.35	<20.0	0.09	1.19	0.820	5.70	3.28	13.4
OUA024	6.19	197	97	16	19	<0.030	0.110	0.087	0.245	31.4	27.6	17.9	10.8	24.2	0.64	1.27	1.46	1.85	4.41	6.71
OUA030	5.86	265	127	65	79	0.169	0.014	0.094	0.284	13.5	105	13.2	5.04	3350	0.12	3.40	2.85	54.6	16.3	26.0
OUA031	6.80	342	151	96.7	118	0.361	<0.010	0.011	0.249	9.31	131	12.0	7.03	2210	0.13	3.38	2.91	22.0	34.4	13.8
OUA034	7.25	360	153	117	143	0.402	<0.010	0.039	0.175	7.49	126	14.1	3.32	767	0.10	3.03	3.21	29.0	35.8	13.0
OUA036	4.64	81	61	7.9	10	<0.030	1.170	0.007	0.062	4.92	69.5	2.50	6.48	<20.0	0.10	1.05	0.940	5.90	5.62	21.0
OUA037	4.97	148	79	27.6	34	<0.030	2.540	0.005	0.037	3.41	99.3	9.42	7.62	<20.0	0.08	1.27	1.63	3.79	7.60	12.4
OUA041	4.56	37	41	<5.0	<5.0	<0.030	0.227	0.007	0.060	2.29	15.8	0.509	2.49	377	0.06	1.25	0.413	7.37	2.34	17.2
OUA048	4.72	134	91	18	21	<0.030	3.790	0.008	0.061	2.77	97.7	8.94	6.95	<20.0	0.10	1.80	1.67	16.6	4.47	20.8
OUA900	5.33	144	100	13	16	<0.030	5.180	0.005	0.042	7.72	173	8.49	4.78	200	0.10	2.94	3.03	8.67	2.75	15.5
OUA901	5.81	272	117	70	85	0.184	<0.010	0.011	0.212	3.18	122	12.9	13.1	2900	0.10	3.77	2.76	36.4	20.8	12.0
Min.	4.46	37	31	<5.0	<5.0	<0.030	<0.010	<0.005	0.020	2.29	15.8	0.509	2.25	<20.0	0.06	1.05	0.413	1.85	2.25	6.71
Max.	7.25	360	153	117	143	0.402	5.18	0.094	0.284	31.4	173	17.9	13.1	3350	0.64	3.77	3.21	54.6	35.8	26.0
Mean	5.44	174	91	37	45	0.103	1.11	0.023	0.123	7.97	86.1	8.62	6.18	823	0.14	2.12	1.87	16.7	11.7	15.1

Table B-17: Pine Bluff Monitoring Area Sampling Locations

Station ID	Collect Date	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
JEF003	5/24/2011	34.26636	-92.02454	820	Sparta	C/I
JEF004	5/24/2011	34.25191	-92.02612	792	Sparta	I
JEF005	5/23/2011	34.22835	-92.02066	859	Sparta	M
JEF007	5/31/2011	34.30172	-92.06005	1085	Sparta	M
JEF008	5/31/2011	34.29487	-92.05610	992	Sparta	M
JEF010	5/23/2011	34.22542	-92.01870	865	Sparta	M
JEF012	5/23/2011	34.19487	-92.04150	848	Sparta	M
JEF024	5/24/2011	34.25341	-91.91433	900	Sparta	M
JEF034	5/23/2011	34.23176	-91.97042	102	Alluvial	C/I
JEF038A	5/24/2011	34.22028	-91.91897	-	Alluvial	C/I
JEF039	5/24/2011	34.21676	-91.89570	1020	Sparta	C/I
JEF041A	8/9/2011	34.25817	-92.06983	-	Sparta	M
JEF044	8/9/2011	34.25555	-92.02634	-	Alluvial	Fish Farm
JEF045	8/9/2011	34.25746	-92.02398	-	Sparta	Fish Farm
JEF900	5/31/2011	34.365401	-92.035105			D
JEF901	5/31/2011	34.297592	-92.03485	-	-	M

Table B-18: Pine Bluff Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
JEF003	6.64	117	76	54.4	66.4	<0.030	0.060	0.012	0.233	4.21	85.8	8.24	2.62	135	0.14	5.62	2.03	15.0	11.0	13.0
JEF004	6.50	116	43	57.5	70.2	0.256	<0.030	<0.010	0.064	0.10	92.4	3.56	2.87	3680	0.13	4.84	1.31	52.0	15.6	15.6
JEF005	6.15	117	73	47.4	57.8	0.179	<0.030	<0.010	0.116	3.25	108	5.74	2.63	2420	0.16	5.87	1.76	56.0	10.5	15.0
JEF007	5.73	106	74	41.2	50.3	0.134	<0.030	<0.010	0.081	3.22	98.3	6.67	2.87	2490	0.14	4.58	2.05	48.1	9.30	17.6
JEF008	5.84	102	76	50.3	61.4	0.132	<0.030	<0.010	0.066	3.83	92.2	5.34	2.72	68.6	0.14	4.84	1.85	51.1	12.3	15.8
JEF010	6.19	132	87	54.0	65.9	0.204	<0.030	0.011	0.145	4.44	115	6.02	2.59	2100	0.19	5.99	1.82	58.0	13.3	15.1
JEF012	6.87	138	89	67.8	82.7	0.254	<0.030	<0.010	0.167	3.32	83.3	7.37	1.98	1780	0.16	5.87	1.77	66.0	15.0	17.2
JEF024	6.65	153	82	65.1	79.4	0.227	<0.030	0.023	0.172	9.69	103	6.02	2.31	2050	0.16	6.13	1.75	48.0	20.7	16.7
JEF034	6.47	642	368	301	367	0.333	<0.030	0.064	0.440	15.1	374	73.0	18.8	11100	0.27	1.26	18.8	250	17.7	28.7
JEF038A	6.65	1050	626	428	522	0.814	<0.030	0.047	0.505	14.45	402	81.8	91.3	12200	<0.05	1.84	20.2	700	91.9	28.5
JEF039	7.04	152	100	72.7	88.7	0.240	<0.030	0.019	0.182	5.65	79.7	6.28	1.86	1560	0.18	5.94	1.64	46.0	21.1	16.0
JEF041A	6.13		82	38.8	47.3	0.142	<0.030	0.011	0.101	3.27	117	4.90	2.99	2300	0.13	4.99	1.58	48.9	11.6	16.1
JEF044	6.24	508	336	180	220	0.732	<0.030	0.173	0.082	4.15	279	31.9	41.3	38500	0.15	2.40	14.1	2600	40.1	33.0
JEF045	6.22	109	74	35.9	43.8	0.215	<0.030	<0.010	0.137	3.64	126	4.72	3.00	3470	0.14	6.01	1.52	66.6	13.9	16.8
JEF900	8.23	592	398	214	261	1.19	<0.030	0.049	0.062	70.8	60.1	15.2	37.2	10.0	0.55	3.80	2.71	26.0	122	13.4
JEF901	6.28	121	73	55.6	67.8	0.167	<0.030	0.043	0.123	3.10	85.9	7.91	2.80	1740	0.09	4.86	1.94	37.8	12.4	15.5
Min.	5.73	102	43	35.9	43.8	<0.030	<0.030	<0.010	0.062	0.10	60.1	3.56	1.86	10.0	<0.05	1.26	1.31	15.0	9.30	13.0
Max.	8.23	1050	626	428	522	1.19	0.060	0.173	0.505	70.8	402	81.8	91.3	38500	0.55	6.13	20.2	2600	122	33.0
Mean	6.49	277	166	110	135	0.327	0.018	0.035	0.167	9.52	144	17.2	13.7	5350	0.17	4.68	4.80	260	27.4	18.4

Table B-19: Athens Plateau Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Aquifer	Use
ATH001	2/25/2008	-	34.32529	-93.50876	90	Stanley Shale	D
ATH004	3/10/2008	-	34.31185	-94.01291	100?	Stanley Shale	D
ATH005	3/10/2008	-	34.31185	-94.01291	180?	Stanley Shale	D
ATH006	3/10/2008	-	34.26494	-94.06884	120	Stanley Shale	D
ATH008	3/10/2008	-	34.29188	-94.18110	207	Stanley Shale	D
ATH010	3/10/2008	-	34.21957	-93.92500	190?	Stanley Shale	D
ATH011	3/10/2008	-	34.19201	-93.90828	140	Stanley Shale	D
ATH012	2/25/2008	-	34.06807	-93.70250	150	Quaternary alluvium	D
ATH013	2/25/2008	-	34.06545	-93.71374	60	Quaternary alluvium	D
ATH014	2/25/2008	-	34.06995	-93.70943	-	Quaternary alluvium	D
ATH014A	2/25/2008	-	-	-	-	-	D
ATH015	2/19/2008	-	33.87584	-93.91357	480	Terrace deposits	M
ATH016	2/19/2008	-	33.88086	-93.91615	525	Terrace deposits	M
ATH017	2/19/2008	-	33.87494	-93.92178	505	Tokio Formation	M
ATH018	3/11/2008	-	33.80346	-93.96156	-	Terrace deposits	M
ATH019	3/11/2008	-	33.92923	-93.88537	85	Tokio Formation	D
ATH020	3/11/2008	-	33.95035	-93.95948	188	Tokio Formation	D
ATH021	3/11/2008	-	33.95772	-93.95915	230	Tokio Formation	D
ATH022	2/26/2008	-	34.00844	-93.56659	125	Quaternary alluvium	D
ATH023	2/26/2008	-	34.04051	-93.67160	-	Quaternary alluvium	C
ATH024	3/11/2008	-	34.15699	-93.73057	420	Jackfork Sandstone	M
ATH025A	2/25/2008	-	-	-	NA	-	S
ATH026	2/25/2008	-	34.35751	-93.50001	110	Stanley Shale	D
ATH027	3/11/2008	-	33.82756	-93.89211	380	-	M

Table B-20: Athens Plateau Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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	6.69	275	167	131	160	<0.030	<0.010	0.025	0.524	4.97	14.0	9.68	3.57	209	0.31	0.294	1.67	569	3.42	10.7
ATH004	4.90	129	122	6	7.32	<0.030	8.20	0.024	0.466	4.63	64.9	5.53	6.56	<20.0	0.15	2.34	2.92	93.8	7.01	29.8
ATH005	4.97	118	101	10.2	12.4	<0.030	5.46	0.020	0.096	3.50	64.0	3.20	10.5	<20.0	0.09	1.60	2.20	69.6	8.86	26.0
ATH006	7.11	240	167	115	140	0.097	<0.010	0.070	0.155	5.10	39.8	28.1	2.21	33.1	0.15	0.621	3.68	243	9.21	32.4
ATH008	6.77	388	246	148	181	<0.030	0.049	0.120	0.212	48.2	32.6	45.6	2.30	<20.0	0.24	0.627	8.53	1.22	11.7	31.4
ATH010	4.63	196	141	<1.0		<0.030	15.1	0.009	0.061	5.16	233	8.18	9.24	<20.0	0.16	3.64	7.40	179	5.80	19.3
ATH011	7.49	284	170	131	160	0.048	0.625	0.024	0.065	6.76	569	12.3	4.16	<20.0	0.13	1.09	3.39	7.26	28.2	13.9
ATH012	7.70	757	412	206	251	0.506	<0.010	0.008	0.024	20.6	99.1	29.1	108	135	0.34	3.44	8.22	8.06	84.2	8.98
ATH013	7.77	954	504	196	239	0.514	0.011	0.009	0.031	49.1	59.8	25.5	131	<20.0	0.87	3.23	7.86	6.95	116	8.92
ATH014	5.93	128	91	49.4	60.3	<0.030	0.026	0.011	0.036	6.31	51.4	12.5	9.33	29.6	0.04	0.908	1.54	46.9	8.89	8.47
ATH014A	6.14	199	210	146	178	<0.030	0.023	0.023	0.087	13.4	92.6	20.0	11.8	2740	0.07	1.09	2.09	110	19.2	8.33
ATH015	8.93	509	289	204	249	0.221	<0.010	0.092	0.120	29.6	<2.00	0.732	6.17	<20.0	0.55	0.419	0.071	1.20	87.9	11.2
ATH016	9.01	655	368	232	283	0.293	<0.010	0.077	0.103	55.1	<2.00	1.41	5.43	<20.0	0.84	0.537	0.122	9.96	108	11.7
ATH017	8.97	525	291	232	283	0.254	<0.010	0.093	0.119	28.9	<2.00	0.722	5.01	<20.0	0.58	0.424	0.072	5.92	89.3	11.4
ATH018	8.78	614	358	245	299	0.123	0.025	0.240	0.271	25.6	<2.00	0.489	11.7	<20.0	0.62	0.742	0.114	1.96	108	10.9
ATH019	5.40	61	67	5.6	6.83	<0.030	0.025	0.009	0.139	7.16	30.4	1.71	2.33	3810	0.14	2.93	1.15	200	2.03	28.4
ATH020	6.48	193	111	87.9	107	<0.030	0.024	0.130	0.164	4.08	26.1	21.3	3.46	<20.0	0.28	2.60	4.40	3.82	5.25	16.7
ATH021	6.10	138	89	56.1	68.4	<0.030	0.048	0.174	0.228	3.59	16.8	13.7	3.78	37.7	0.27	2.25	3.32	0.810	4.14	18.1
ATH022	5.85	89	72	51.8	63.2	<0.030	0.346	0.008	0.271	0.59	13.1	15.1	2.26	<20.0	<0.01	0.175	0.50	9.93	1.21	11.5
ATH023	8.23	559	322	203	248	0.547	<0.010	0.025	0.042	40.9	43.3	7.31	30.7	58.1	0.39	2.77	1.87	14.3	84.2	8.75
ATH024	6.77	414	236	169	206	0.143	<0.010	0.010	0.182	3.50	107	3.25	24.9	2410	0.26	1.16	2.60	79.4	63.2	13.1
ATH025A	4.88	163	113	6	7.32	<0.030	11.1	0.016	0.058	5.89	43.5	6.67	6.61	<20.0	0.06	1.83	5.58	57.0	6.56	16.3
ATH026	7.24	383	226	183	223	0.036	0.011	0.066	0.182	5.59	127	42.6	7.59	59.2	0.29	0.694	7.44	515	12.7	32.5
ATH027	6.82	213	136	78.5	95.8	0.083	<0.010	0.033	0.229	14.3	2.72	0.834	5.35	620	0.18	1.61	0.364	16.4	34.0	11.1
Min.	4.63	61	67	<1.0	6.83	<0.030	<0.010	0.008	0.024	0.59	<2.00	0.489	2.21	<20.0	<0.01	0.175	0.071	0.810	1.21	8.33
Max.	9.01	954	504	245	299	0.547	15.1	0.240	0.524	55.1	569	45.6	131	3810	0.870	3.64	8.53	569	116	32.5
Mean	6.82	341	209	121	153	0.127	1.71	0.055	0.161	16.4	72.3	13.1	17.2	428	0.292	1.54	3.21	93.8	37.9	16.7

Table B-21: Frontal Ouachitas Monitoring Area Sampling Locations

Station ID	Collect Date	T/R Location	Latitude	Longitude	Well Depth (ft.)	Surface Geology	Use
FRO001	11/15/2010	-	34.682499	-92.423399	175	Womble Shale	D
FRO002	11/30/2010	-	34.743699	-92.500501	120	Stanley Shale	D
FRO007	11/30/2010	-	34.798399	-92.569001	70	Womble Shale	D
FRO012	11/30/2010	-	34.746698	-92.544400	75	Womble Shale	D
FRO013	1/30/2010	-	34.745199	-92.544200	<75	Womble Shale	D
FRO015	11/15/2010	-	34.681766	-92.423542	450-500	Womble Shale	D
FRO017	11/15/2010	-	34.681036	-92.422138	200	Womble Shale	D
FRO018	11/15/2010	-	34.679969	-92.423099	<180	Womble Shale	D
FRO019	11/15/2010	-	34.680299	-92.423070	180	Womble Shale	D
FRO020	11/15/2010	-	34.685784	-92.423145	<35	Womble Shale	D
FRO021	11/15/2010	-	34.685349	-92.423503	-	Womble Shale	D
FRO022	11/15/2010	-	34.685295	-92.444916	140	Womble Shale	D
FRO024	11/30/2010	-	34.793798	-92.691600	NA	Bigfork Chert/Polk Creek Sh. Contact	S
FRO025	11/30/2010	-	34.787598	-92.620199	120	Womble Shale	D
FRO026	11/30/2010	-	34.771700	-92.566401	NA	Arkansas Novaculite	S
FRO028	12/1/2010	-	34.910102	-92.492544	90	Terrace	M
FRO031	1/18/2010		34.791830	-92.559280	300	Bigfork Chert	D
FRO032	11/30/2010	-	34.774485	-92.549264		Bigfork Chert	D
FRO034	12/1/2010	-	34.899684	-92.469098	NA	Terrace	S

Table B-22: Frontal Ouachitas Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	O-Phos.	T-Phos.	SO4	Ba	Ca	Cl	Fe	F	K	Mg	Mn	Na	SiO2
		uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L
FRO001	7.16	466	214	207	253	<0.030	3.20	<0.010	0.046	17.2	22.2	75.2	10.4	<20.0	0.50	1.35	12.4	1.10	5.18	14.5
FRO002	4.96	46	45	20	24.4	<0.030	0.620	0.050	0.080	1.63	32.0	4.91	3.61	<20.0	0.10	0.136	2.36	19.0	3.07	12.6
FRO007	5.62	93	64	33.3	40.6	<0.030	<0.030	0.366	0.515	12.0	<2.00	5.48	3.74	518	0.34	0.217	8.24	49.0	2.19	12.4
FRO012	7.18	443	271	236	288	0.041	0.060	0.013	0.052	16.3	26.6	61.9	5.54	<20.0	0.38	1.11	17.8	9.40	12.0	18.8
FRO013	6.77	673	395	298	364	<0.030	0.347	<0.010	0.040	29.3	50.9	69.2	33.6	28.1	0.25	0.573	21.8	8.90	15.8	15.4
FRO015	7.05	390	190	138	168	<0.030	8.15	0.041	0.087	18.6	32.9	51.9	8.52	<20.0	0.33	1.11	13.4	2.10	3.36	17.6
FRO017	7.12	453	259	189	231	<0.030	0.681	0.011	0.038	40.1	32.6	70.2	4.96	<20.0	0.38	0.996	11.7	0.41	5.76	13.1
FRO018	7.25	417	164	208	254	<0.030	<0.030	<0.010	0.022	10.6	33.7	46.5	5.24	<20.0	0.48	1.51	25.4	11.0	3.61	10.2
FRO019	7.43	325	126	161	196	<0.030	<0.030	<0.010	0.030	8.28	34.5	37.9	2.71	<20.0	0.40	1.51	18.0	7.60	1.62	10.6
FRO020	5.56	175	73	33.9	41.4	<0.030	2.91	0.023	0.124	23.7	26.3	15.3	14.4	<20.0	0.33	0.675	7.53	78.0	7.24	18.6
FRO021	6.62	490	212	138	168	<0.030	7.3	0.163	0.208	17.7	19.9	50.5	24.3	<20.0	0.41	1.32	15.1	22.0	10.4	18.0
FRO022	7.52	217	96	97.0	118	<0.030	1.58	0.029	0.072	16.2	6.86	23.3	6.09	<20.0	0.39	0.71	15.5	0.75	2.09	16.4
FRO024	4.21	37	22	<1.0	<1.0	<0.030	<0.030	0.024	0.126	9.22	6.91	1.11	1.97	1540	<0.05	0.454	1.41	26.0	1.19	11.2
FRO025	6.84	372	236	187	228	0.042	<0.030	0.014	0.052	25.1	23.6	63.7	3.21	24.2	0.11	0.651	8.84	150	6.53	15.6
FRO026	4.00	17	15	<1.0	<1.0	<0.030	<0.030	<0.010	0.022	2.09	5.44	0.417	1.66	21.1	<0.05	0.366	0.30	21.0	1.06	8.88
FRO028	5.92	206	155	71.4	87.1	<0.030	1.21	0.025	0.111	10.8	132	16.7	18.8	<20.0	0.10	1.30	4.66	0.75	17.1	33.8
FRO031	4.30	23	39	5	6.10	0.039	<0.030	0.028	0.017	9.15	8.54	0.346	1.86	949	0.06	0.444	0.38	6.55	0.973	11.6
FRO032	6.73	363	231	158	193	0.048	<0.030	<0.010	0.056	42.6	9.46	62.7	2.57	558	0.23	0.962	8.73	150	4.87	11.2
FRO034	4.86	122	102	7.3	8.91	<0.030	4.06	0.010	0.080	16.6	152	2.81	10.1	51.2	0.08	3.64	2.65	70.0	13.0	25.0
Min.	4.00	17.0	15.0	<1.0	<1.0	<0.030	<0.030	<0.010	0.020	1.63	<2.00	0.350	1.66	<20.0	<0.05	0.14	0.30	0.41	0.97	8.88
Max.	7.52	673	395	298	364	0.048	8.15	0.370	0.520	42.6	152	75.2	33.6	1540	0.50	3.64	25.4	150	17.1	33.8
Mean	6.16	280	153	115	140	0.021	1.59	0.040	0.090	17.2	34.6	34.7	8.59	200	0.26	1.00	10.3	33.4	6.16	15.5

Table B-23:North Central Monitoring Area Sampling Locations

Station ID	Collect Date	Latitude	Longitude	Well Depth (ft.)	Surface Geology	Use
FSH-001	5/25/2010	35.140345	92.437848	103	Atoka	D
FSH-002	5/25/2010	35.145181	92.405621		Atoka	D
FSH-003	5/26/2010	35.223484	92.496916	128	Atoka	D
FSH-004	5/26/2010	35.217852	92.496859	spring	Atoka	S
FSH-005	5/26/2010	35.222644	92.499561	103	Atoka	D
FSH-006	5/26/2010	35.214454	92.486393	spring	Atoka	D
FSH-007	6/2/2010	35.273087	92.544614	63	Atoka	D
FSH-008	6/2/2010	35.269453	92.544106		Atoka	D
FSH-009	6/3/2010	35.425397	92.634273	40	Atoka	D
FSH-010	6/15/2010	35.204864	92.127903	90	Atoka	D
FSH-011	6/15/2010	35.229461	92.168299		Atoka	D
FSH-012	6/15/2010	35.232696	92.174544	106	Atoka	D
FSH-013	6/15/2010	35.23919	92.193702	147	Atoka	D
FSH-014	6/16/2010	35.250439	92.221843		Atoka	D
FSH-015	6/16/2010	35.291044	92.228736	235	Atoka	D
FSH-016	6/16/2010	35.28815	92.284745	spring	Atoka	S
FSH-017	6/16/2010	35.276538	92.230992		Atoka	D
FSH-018	6/28/2010	35.341985	92.552207	65	Atoka	D
FSH-019	6/28/2010	35.216803	92.17802	100	Atoka	D
FSH-020	6/28/2010	35.243385	92.186496	237	Atoka	D
FSH-021	6/28/2010	35.24319	92.197199	200	Atoka	D
FSH-022	6/28/2010	35.275781	92.228843	125	Atoka	D
FSH-023	6/29/2010	35.290211	92.552435	175	Atoka	D
FSH-024	6/29/2010	35.24133	92.175709	189	Atoka	D
FSH-025	6/30/2010	35.333436	92.256241	317	Atoka	D
FSH-026	6/30/2010	35.361603	92.271981	132	Atoka	D
FSH-027	6/30/2010	35.358051	92.270993		Atoka	D
FSH-028	6/30/2010	35.352001	92.276657	120	Atoka	D
FSH-029	6/30/2010	35.354293	92.272925	130	Atoka	D
FSH-030	6/30/2010	35.364953	92.288758	spring	Atoka	S
FSH-031	7/6/2010	35.421741	92.296236	243	Atoka	D
FSH-032	7/8/2010	35.600222	92.429373	70	Atoka	D
FSH-033	7/8/2010	35.331964	91.703878	73	Atoka	D
FSH-034	7/20/2010	35.472875	91.818363	240	Atoka	D
FSH-035	7/20/2010	35.492125	91.924842	1500	Atoka	D
FSH-036	7/20/2010	35.49186	92.027192	spring	Atoka	S
FSH-037	7/20/2010	35.493326	92.025727	spring	Atoka	S

Table B-23:North Central Monitoring Area Sampling Locations, cont.

Station ID	Collect Date	Latitude	Longitude	Well Depth (ft.)	Surface Geology	Use
FSH-038	7/20/2010	35.492057	92.026345	spring	Atoka	S
FSH-039	7/21/2010	35.474189	91.816923	136	Atoka	D
FSH-040	7/21/2010	35.492129	92.02629	spring	Atoka	S
FSH-041	7/21/2010	35.483367	91.928487	609	Atoka	M
FSH-042	7/27/2010	35.199598	92.127485		Atoka	D
FSH-043	7/27/2010	35.632462	92.009314	spring	Atoka	S
FSH-044	7/27/2010	35.632575	92.009203	121	Atoka	D
FSH-045	8/9/2010	35.049275	92.487905	56	Atoka	D
FSH-046	8/9/2010	35.283628	92.553547		Atoka	D
FSH-047	8/9/2010	35.36524	92.293861	300	Atoka	D
FSH-048	8/9/2010	35.417499	92.301395	400	Atoka	D
FSH-049	8/10/2010	35.370593	91.729544	200	Atoka	D
FSH-050	8/10/2010	35.369167	91.827778	127	Atoka	D
FSH-051	8/16/2010	35.370056	91.732105	305	Atoka	D
FSH-052	8/16/2010	35.462897	91.962322	100	Atoka	D
FSH-053	8/17/2010	35.442886	91.975418	139	Atoka	D
FSH-054	8/17/2010	35.470494	91.902373	32	Atoka	D
FSH-055	8/24/2010	35.572903	92.036174	150	Atoka	D
FSH-056	8/24/2010	35.491817	92.027246	spring	Atoka	S
FSH-057	9/14/2010	35.394523	91.718288		Atoka	D
FSH-058	9/14/2010	35.600552	91.817361	261	Atoka	D
FSH-059	9/28/2010	35.044571	92.066762		Atoka	D
FSH-060	9/28/2010	35.450182	91.76567		Atoka	D
FSH-061	10/20/2010	35.332491	91.717336	165	Atoka	D
FSH-062	10/20/2010	35.626194	91.880858	322	Atoka	D
FSH-063	10/26/2010	35.29785	92.280476		Atoka	D
FSH-064	11/15/2010	35.508886	92.681822	80	Atoka	D

Table B-24: North Central Monitoring Area Selected Descriptive Statistics

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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
FSH-001	4.91	387	238	137	167	0.172	<0.010	0.007	0.157	18.6	105	27.3	24.6	3200	0.15	0.734	8.04	119	37.4	20.9
FSH-002	5.06	407	235	106	129	0.231	<0.010	0.008	0.131	10.1	142	23.4	48.2	2330	0.23	0.620	16.4	235	24.0	27.0
FSH-003	5.60	225	148	74.5	90.9	0.119	<0.010	0.014	0.242	7.14	50.3	23.2	9.08	3160	0.23	0.231	5.32	352	8.81	26.1
FSH-004	5.27	32	45	9.1	11.1	<0.030	0.033	0.006	0.088	1.93	9.22	1.84	1.10	576	0.11	0.150	1.37	137	2.20	15.0
FSH-005	3.93	258	169	102	124	0.164	<0.010	0.017	0.214	5.23	70.7	25.4	9.10	2610	0.21	0.369	7.56	226	12.9	31.0
FSH-006	3.94	46	39	12.6	15.4	0.075	0.191	0.055	0.110	1.97	6.63	3.69	3.52	148	0.09	1.29	1.24	65.3	2.62	6.16
FSH-007	4.73	214	170	103	126	0.060	0.027	0.007	0.117	4.75	43.5	24.1	3.42	715	0.16	0.446	4.51	298	11.1	31.8
FSH-008	4.01	252	168	113	138	0.180	<0.010	0.005	0.405	10.3	89.4	23.8	3.96	1220	0.20	0.422	6.51	160	15.6	30.2
FSH-009	3.51	213	154	105	128	0.199	<0.010	0.010	0.255	4.57	69.1	18.8	1.71	2670	0.22	0.529	6.92	248	12.8	29.7
FSH-010	5.19	311	186	143	174	0.392	<0.010	0.011	0.210	10.8	102	18.1	7.13	1310	0.30	0.837	12.6	141	29.5	31.4
FSH-011	6.36	301	200	137	167	0.304	<0.010	0.075	0.169	19.0	125	26.9	4.64	183	0.15	0.830	6.34	190	30.0	29.9
FSH-012	5.37	477	363	71.3	87.0	0.222	<0.010	0.060	0.212	151	93.9	60.5	5.07	3930	0.12	0.913	13.1	605	13.7	36.2
FSH-013	5.75	309	193	168	205	0.231	<0.010	0.090	0.187	4.27	122	12.3	2.72	139	0.18	0.751	3.00	28.0	59.4	29.6
FSH-014	4.79	100	59	45.4	55.4	<0.030	<0.010	0.008	0.274	2.07	13.8	6.29	1.63	1870	0.18	0.462	3.87	1580	6.04	29.6
FSH-015	7.10	437	266	213	260	0.183	<0.010	0.053	0.090	0.89	26.8	1.49	3.05	<20.0	0.21	0.278	0.32	8.10	106	14.4
FSH-016	6.68	237	146	129	157	0.076	<0.010	0.009	0.227	4.14	86.0	23.8	2.17	1720	0.22	0.648	6.71	445	19.1	30.1
FSH-017	4.89	169	129	82.2	100	0.158	<0.010	0.014	0.401	1.45	52.3	9.95	2.74	2500	0.25	0.489	5.03	289	18.0	44.9
FSH-018	4.09	118	67	<5.0	<5.0	<0.030	4.82	0.009	0.051	4.40	178	1.92	15.5	25.1	0.26	2.25	4.15	205	7.68	19.6
FSH-019	6.81	409	234	191	233	0.476	0.020	0.038	0.171	12.1	128	30.3	7.70	287	0.24	0.664	15.2	49.8	30.0	32.2
FSH-020	8.18	412	247	209	255	0.141	<0.010	0.087	0.125	1.07	20.0	0.653	3.49	<20.0	0.19	0.287	0.177	1.96	96.8	14.8
FSH-021	7.32	351	194	171	209	<0.030	0.279	0.016	0.058	5.03	189	17.4	4.58	23.1	0.08	0.780	4.24	19.1	53.7	18.4
FSH-022	5.76	193	129	48.6	59.3	<0.030	1.79	0.013	0.151	2.49	53.8	5.73	24.1	<20.0	0.22	0.333	3.65	620	24.2	39.5
FSH-023	6.48	153	182	101	123	0.060	<0.010	0.018	0.363	8.93	66.3	25.4	2.91	2760	0.16	0.537	4.69	431	12.1	42.8
FSH-024	7.49	205	168	170	207	0.339	<0.010	0.032	0.120	2.75	251	30.9	3.41	218	0.09	0.855	6.67	30.8	29.1	28.3
FSH-025	6.84	176	182	137	167	0.054	<0.010	0.024	0.143	5.15	142	33.3	3.00	146	0.22	0.768	10.1	246	9.74	35.6
FSH-026	7.30	129	184	147	179	0.252	<0.010	0.073	0.163	2.31	99.7	26.9	5.20	248	0.11	0.689	4.97	88.7	29.8	27.4
FSH-027	7.25	153	162	130	159	0.209	<0.010	0.054	0.139	3.06	117	25.3	3.70	208	0.10	0.588	4.71	122	24.6	26.6
FSH-028	6.58	159	180	91.4	112	0.121	<0.010	0.006	0.105	34.4	144	31.5	4.55	764	0.11	0.665	8.13	306	7.46	28.6
FSH-029	6.32	94	117	35.3	43.1	0.100	<0.010	0.023	0.278	11.1	55.1	10.8	4.63	4230	0.15	0.600	5.01	903	7.54	32.6
FSH-030	4.98	20	28	<5.0	<5.0	<0.030	0.867	<0.005	0.046	1.55	35.4	1.04	2.75	38.0	0.02	0.869	0.894	57.9	1.61	11.6
FSH-031	5.53	53	54	5.0	6.1	<0.030	0.306	0.007	0.042	7.94	15.0	2.65	2.61	6680	0.06	0.218	0.858	154	2.37	19.1
FSH-032	6.11	100	118	39.8	48.6	0.099	<0.010	0.032	1.20	2.38	18.3	7.83	9.30	6560	0.16	0.428	5.04	1520	14.2	14.1
FSH-033	6.40	180	187	96.5	118	<0.030	<0.010	0.009	0.083	2.28	42.8	30.1	32.0	1960	0.16	0.752	8.83	1720	13.2	22.4

Table B-24: North Central Monitoring Area Selected Descriptive Statistics, cont.

Sample ID	pH	Conductivity	TDS	Alkalinity	HCO3	NH3-N	NO2 + NO3	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
FSH-034	7.32	297	291	225	275	<0.030	<0.010	0.008	0.069	18.1	39.2	57.9	16.4	119	0.14	0.872	22.2	128	15.5	24.2
FSH-035	8.79	179	258	220	268	0.179	<0.010	0.013	0.041	0.18	10.6	0.963	7.05	<20.0	0.23	0.410	0.202	5.46	115	12.4
FSH-036	6.99	347	292	208	254	0.181	<0.010	0.061	0.125	4.26	157	44.9	35.6	<20.0	0.24	1.03	12.4	402	54.5	25.2
FSH-037	7.23	596	560	325	397	0.283	<0.010	0.100	0.088	103	139	61.8	49.5	<20.0	0.22	1.44	34.6	296	110	18.0
FSH-038	7.59	702	576	378	461	0.297	<0.010	0.029	0.076	10.3	212	31.2	103	<20.0	0.48	1.28	17.8	75.9	209	16.7
FSH-039	5.09	29	21	12	14.6	<0.030	0.320	0.006	0.038	1.35	5.19	3.09	5.83	<20.0	0.03	0.257	1.52	11.2	3.10	15.9
FSH-040	7.73	779	644	385	470	0.140	<0.010	0.006	0.073	29.6	126	11.2	105	<20.0	0.64	1.02	9.29	9.06	245	13.2
FSH-041	8.25	501	492	360	439	0.437	<0.010	0.050	0.079	26.4	100	5.68	35.1	<20.0	0.81	1.06	5.07	8.04	196	11.6
FSH-042	7.95	255	246	184	224	0.421	<0.010	0.200	0.325	8.58	57.8	12.8	20.6	273	0.24	0.660	6.15	73.4	69.5	29.7
FSH-043	4.79	13	<1	<5.0	<5.0	<0.030	<0.010	0.008	0.021	0.95	7.87	0.160	2.20	20.7	<0.01	0.376	0.207	13.5	1.5	8.41
FSH-044	5.15	14	10	<5.0	<5.0	<0.030	<0.010	0.006	0.019	1.10	7.14	0.352	2.39	73.1	<0.01	0.275	0.352	83.9	1.83	8.89
FSH-045	6.39	310	285	156	190	0.137	<0.010	0.015	0.064	20.7	42.7	17.5	46.5	2500	0.14	0.341	20.5	407	53.7	12.4
FSH-046	7.20	50	47	23.7	28.9	<0.030	0.083	0.215	0.245	7.08	12.3	2.37	6.11	<20.0	<0.01	2.35	1.52	3.69	7.24	1.26
FSH-047	8.38	274	287	228	278	0.117	<0.010	0.181	0.216	0.31	24.6	2.84	4.49	46.0	0.21	0.317	0.638	36.1	103	13.3
FSH-048	4.56	49	67.0	13.5	16.5	<0.030	4.28	0.007	0.035	4.98	36.7	4.36	3.99	<20.0	0.05	0.628	2.73	84.0	5.83	10.9
FSH-049	6.08	225	279	122	149	<0.030	0.109	0.009	0.077	12.3	133	30.3	69.1	347	0.21	2.42	21.8	226	19.1	15.9
FSH-050	8.65	208	218	184	224	0.141	<0.010	0.127	0.158	1.61	21.2	9.50	4.98	<20.0	0.46	0.221	1.28	6.89	62.5	12.4
FSH-051	5.81	117	81	16.2	19.8	<0.030	0.081	0.013	0.095	1.95	38.8	7.34	3.69	<20.0	0.24	1.03	5.96	515	6.04	20.4
FSH-052	6.71	104	63	39.1	47.7	0.102	<0.010	0.034	0.268	0.24	32.4	3.16	3.22	9600	0.07	0.449	1.76	90.3	13.9	13.0
FSH-053	3.97	40	41	<5.0	<5.0	<0.030	2.40	0.009	0.029	0.76	14.4	1.31	2.71	<20.0	0.03	0.201	0.976	153	2.42	11.1
FSH-054	6.76	940	630	193	235	0.307	<0.010	0.013	0.069	192	37.0	73.1	51.8	1210	0.12	2.40	51.7	631	28.7	19.0
FSH-055	4.04	56	45	8.8	10.7	<0.030	0.217	0.009	0.040	2.85	12.3	1.02	7.87	99.5	0.04	0.399	2.88	169	4.00	17.2
FSH-056	7.38	572	314	205	250	0.048	<0.010	0.042	0.114	7.64	150	40.9	36.3	33.4	0.27	1.01	11.9	392	49.9	23.8
FSH-057	8.17	671	403	264	322	0.081	<0.010	0.075	0.111	2.25	<2.00	0.092	10.2	<20.0	0.48	0.852	0.044	0.91	158	10.9
FSH-058	3.55	107	77	<5.0	<5.0	<0.030	6.40	0.012	0.032	0.54	48.5	4.24	10.3	<20.0	0.08	1.76	2.45	152	5.87	9.30
FSH-059	6.14	186	147	88.5	108	0.045	<0.010	0.030	0.850	2.77	28.2	11.4	2.10	6100	0.22	0.580	8.28	1840	11.5	38.1
FSH-060	8.78	491	288	251	306	0.249	<0.010	0.324	0.380	0.19	6.79	0.249	7.56	<20.0	0.74	0.488	0.066	1.64	125	17.5
FSH-061	7.31	611	311	201	245	0.518	<0.030	0.016	0.062	8.55	254	26.2	59.6	128	0.15	1.72	7.55	40.0	82.4	13.8
FSH-062	5.74	458	225	3.3	4.0	0.101	<0.030	0.043	0.048	8.19	67.0	13.6	104	11300	0.18	0.983	6.10	2800	52.9	10.0
FSH-063	7.34	380	271	198	242	0.316	<0.030	0.082	0.155	1.03	87.5	11.9	2.49	59.2	0.16	0.776	3.13	20.0	67.8	24.6
FSH-064	6.46	235	128	124	151	0.149	0.203	0.124	0.194	6.89	21.2	8.71	1.36	31.8	0.17	0.464	3.01	46.0	46.1	21.8
min	3.51	13	10	<5.0	<5.0	<0.030	<0.010	0.0025	0.019	0.18	<2.00	0.092	1.1	<20.0	<0.01	0.15	0.044	0.91	1.5	1.26
max	8.79	940	644	385	470	0.518	6.4	0.324	1.2	192	254	73.1	105	11300	0.81	2.42	51.7	2800	245	44.9
mean	6.20	267	205	124	152	0.143	0.355	0.043	0.171	13.3	73.4	17.4	16.94	1321	0.20	0.771	7.19	318	42.2	21.5

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