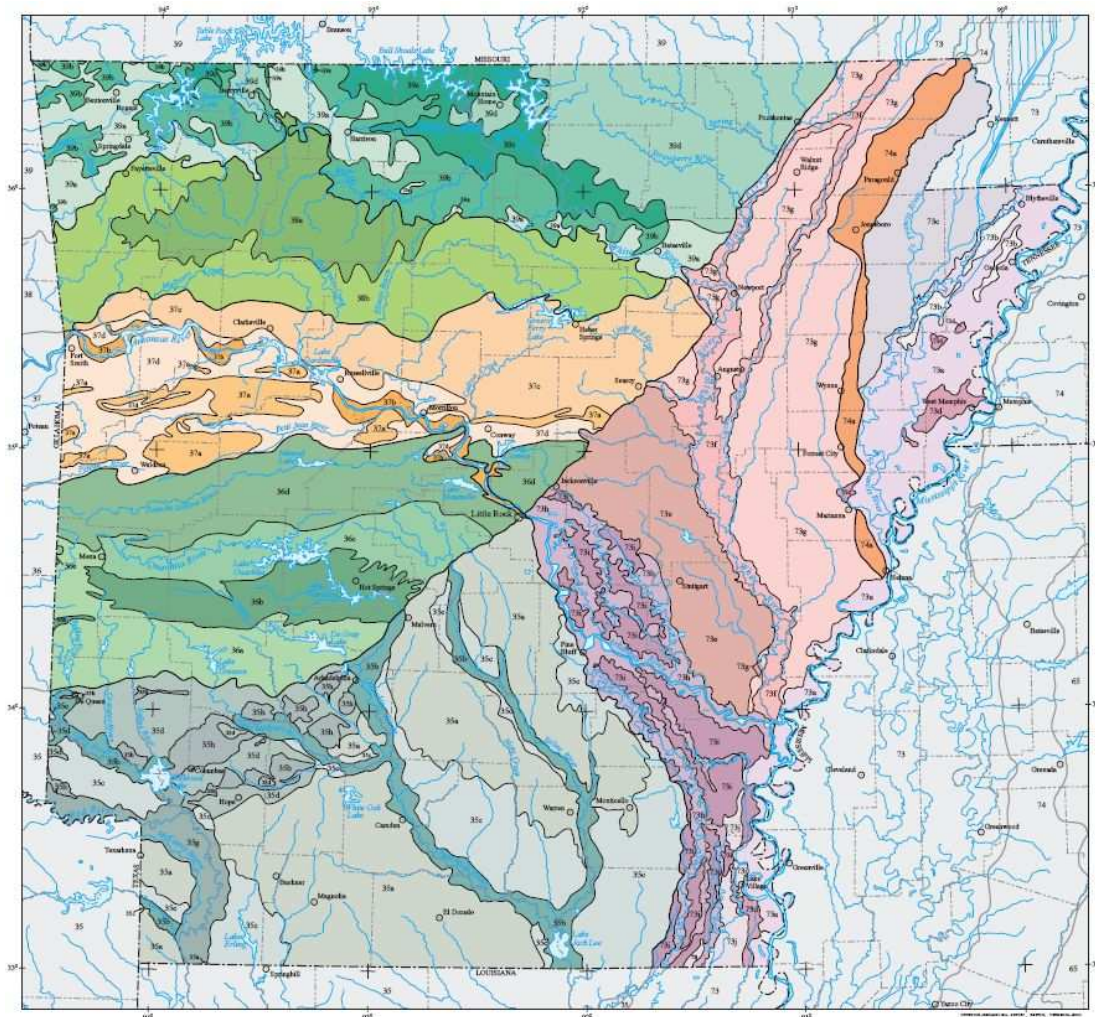


# State of Arkansas



## DEPARTMENT OF ENVIRONMENTAL QUALITY

**2010**

### List of Impaired Waterbodies

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



## **ARKANSAS'S 2010 303(d) LIST (LIST OF IMPAIRED WATERBODIES)**

Arkansas's 2010 List of Water Quality Limited Waterbodies has been formatted to reflect the most current guidance issued by the US Environmental Protection Agency (USEPA). As part of that guidance, USEPA suggests placing waterbody segments into categories reflecting their attainment status. Category 5 is subdivided by ADEQ for planning and management purposes.

- 1 = Attaining all water quality standards;
- 2 = Attaining some water quality standards, but there is 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 does not meet the spatial and/or temporal requirements outlined in this assessment methodology;
  - Waters in which the data is 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. Waterbodies 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 is insufficient data to make a scientifically defensible decision concerning designated use attainment; or
    - Waters ADEQ assessed as unimpaired, but were added to the list by EPA.

Water quality data from a very large pool of stream and lake sampling sites was considered. These stations were associated with either one of ADEQ's monitoring networks; special surveys conducted by ADEQ; sites maintained by the U.S. National Park Service; sites maintained by the U.S. Geological Survey; sites associated with the Arkansas Natural Resources Commission activities; and other entities that supplied the Department with data.

Each table within the list contains the name of the waterbody, HUC (Hydrologic Unit Code) and stream reach identifier, the number of stream miles affected, and the monitoring station(s) used to assess the segment. Some segments may have more than one designated use, or none at all, assessed as not attaining. Some segments are listed solely because a water quality standard is not being attained. Some stream segments are impaired by multiple sources (i.e. municipal point source and surface erosion) or causes (metals and silt), while an individual cause (silt) may be from multiple sources (municipal point source and surface erosion).

The Water Quality Limited Waterbody tables utilize the following abbreviations:

General:

x = Designated Use or  
Water Quality Standard not attained  
H = High Priority  
M = Medium Priority  
L = Low Priority

Designated Uses:

FC = Fish Consumption  
FSH = Fisheries<sup>1</sup>  
PC = Primary Contact  
SC = Secondary Contact  
DW = Domestic Water Supply  
AI = Agriculture & Industry Water Supply

Water Quality Standard:

Tb = Siltation/Turbidity  
AM = Ammonia  
NO<sub>3</sub> = Nitrogen  
TP = Total Phosphorus  
pH = pH  
DO = Dissolved Oxygen  
PA = Pathogen Indicators (bacteria)  
Tm = Temperature  
CL = Chlorides  
SO<sub>4</sub> = Sulfates  
TDS = Total Dissolved Solids  
PO = Priority Organics  
Be = Beryllium  
Cd = Cadmium  
Cu = Copper  
Pb = Lead  
Zn = Zinc  
Hg = Mercury

Sources:

AG = Agriculture  
SE = Surface Erosion<sup>2</sup>  
RE = Resource Extraction  
SV = Silviculture  
UR = Urban Runoff  
RC = Road Construction/Maintenance  
IP = Industrial Point Source  
MP = Municipal Point Source  
HP = Hydropower  
UN = Unknown

Notes:

1 Previously Aquatic Life Use.

2 Surface Erosion – This category includes erosion from agriculture activities, construction activities, unpaved road surfaces, and in-stream erosion mainly from unstable stream banks.

## **Glossary of Terms Used**

**Channel-Altered Stream** – Waterbodies mainly located in the State’s Delta ecoregion that have been straightened for irrigation and flood control purposes.

**Fisheries** – Fish, macroinvertebrate, and plant life in a waterbody.

**Hydrologic Unit Code (HUC)** – An eight digit number used to identify large sections of streams and/or rivers. Used in conjunction with the Stream Reach Identifiers.

**Macroinvertebrate** – Small aquatic organisms that live all or part of their life in the water. They are a vital part of the food chain in the stream.

**Nitrates** – A chemical in the water derived from nitrogen. Excessive nitrates in drinking water pose serious human health threats. Excessive nitrates in streams, rivers, and lakes can lead to excessive algae growth and can threaten the health of the aquatic life in those systems.

**Pathogens** – Bacteria, most commonly fecal coliforms and/or *Escherichia coli*.

**Quality Assurance/Quality Control (QA/QC)** – The procedures used when sampling, analyzing, assessing, and reporting environmental data to insure that the data is scientifically defensible.

**Regulation No. 2** – Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas (<http://www.adeq.state.ar.us/regs/default.htm>).

**Silt** – Very fine particles of soil that are easily transported in the water column of streams and rivers. These particles settle out onto the bottom of the streams and rivers and can impair the aquatic life of the waterbody.

**Stream Reach Identifier** – Three digit numbers used to identify distinct small portions of streams, rivers, and/or tributaries that make up larger hydrologic units.

**Total Dissolved Solids (TDS)** – Those particles in the water column that exist in the dissolved form and typically do not settle out onto the bottom of the stream.

**Total Maximum Daily Load (TMDL)** - a determination of the total amount of a substance that can be present in a waterbody without adversely affecting the designated use(s) of the waterbody.

**Waterbody** – A stream, river, lake, reservoir, or any portion thereof being referred to.

## INTRODUCTION

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, ADEQ follows the specific requirements of 40 CFR Sections 130.7 and 130.8. The criterion within this assessment methodology are utilized to make attainment decisions of the designated uses 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 one-time exceedance of water quality criteria due to anthropogenic disruptions may or may not cause a water quality impact, but allows for the pursuit of enforcement actions.

ADEQ develops a biennial report on the condition of the state's waters. As per EPA guidance, "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," these waters are evaluated in terms of whether their assigned designated uses, as delineated in the Arkansas Pollution Control and Ecology Commission's Regulation No. 2, Reg 2.302, are being supported.

The following assessment methodology will be used to determine water quality standards attainment from long-term and/or frequently occurring exceedances of the water quality criteria.

The primary data used in the evaluations is generated as part of the Arkansas Department of Environmental Quality's (ADEQ) water quality monitoring activities as described in the most recent version of the "State of Arkansas's Water Quality Monitoring and Assessment Program." In addition, pursuant to 40 CFR §130.7(b)(5), ADEQ will assemble and evaluate 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 (Act 876 of 1985 as amended);
- 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 data set 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 distributed over at least three seasons (to include inter-seasonal variation) and over two years (to include inter-year variation) will be utilized. The data set 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, or macroinvertebrate data that should be collected over two seasons.

**PERIOD OF RECORD:**

**metals and ammonia toxicity analysis - April 1, 2006 to March 31, 2009**

**all other analyses - April 1, 2004 to March 31, 2009**

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), changes in water quality standards, and the completion of total maximum daily loads, will be considered during the next assessment period.

**ASSESSMENT**

ADEQ must take into consideration the possibility of naturally occurring disruptions that may cause exceedances of a standard, but do not result in designated use impairment. 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 stream segment as outlined in the “State of Arkansas Water Quality Monitoring and Assessment Program, Revision 3, March 2009.”

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 with no new data, the previous assessment decisions will be carried forward. However, if a significant 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 exceedance shown in the Assessment Criteria Tables are calculated using the total number of samples collected. The number of data points exceeding the criteria that are necessary for an assessment decision will be calculated and rounded up to the nearest whole number; e.g. 25% of 38 data points = 9.5, therefore ten (10) exceedances equal 25%.

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 can not 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 can not be made for contiguous stream segments to monitored waters when a tributary enters the water body either upstream or downstream of the monitored segment, and monitoring data for that tributary indicates impairment. 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 collected from any of the states lakes in the past five years, except for a very limited amount of data collected from four lakes to determine reference conditions.

#### ***Narrative Criteria***

Waters will be assessed as "non-support" when violation of any narrative water quality standard has been verified by ADEQ. This will be accomplished by use of reports documenting a water quality standards impairment caused by the exceedance of a narrative criterion. The validity of the report must have been verified by an ADEQ employee. 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 in Section 4.0.

#### ***Impairment Source Determination***

For any water body 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 water body) and best professional judgment.

# WATER QUALITY STANDARDS

## *Antidegradation*

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.

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.

## *Designated Uses*

Designated Use	Parameters
Fisheries (Regulation 2.302F)	Biological Integrity (macroinvertebrate and/or fish) data.
Domestic Water Supply (Regulation 2.302G)	Compounds which are not easily removed by drinking water treatment facilities; compounds with established secondary MCL’s, e.g., Cl, SO <sub>4</sub> , TDS,
Primary and Secondary Contact (Regulation 2.302D, E)	<i>Escherichia coli</i> (use Fecal Coliform bacteria data in the absence of <i>E. coli</i> data).
Industrial Water Supply (Regulation 2.302H)	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 <sub>4</sub> , TDS.
Agriculture Water Supply (Regulation 2.302I)	

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.

Key to the footnotes in the assessment criteria tables is as follows:

- 1 - Except for site specific standards approved in water quality standards
- 2 - Criteria based on 90<sup>th</sup> percentile of ecoregion values
- 3 - Refers to the number of data points instead of a percentage (i.e. greater than one value exceeding criteria = non-support).



**General Criteria**

**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 exists 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 ADEQ’s. The following tables outline the evaluation protocol and the listing protocol for biological integrity support determinations.

**Biological Integrity Evaluation Protocol**

<b>Indicator</b>	<b>Data Type</b>	<b>Supporting</b>	<b>Not Supporting</b>
Macroinvertebrate Community	Macroinvertebrate Community Data Available	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.	
		Hilsenhoff Biotic Index (HBI), Ephemeroptera/Plecoptera/Trichoptera (EPT), and taxa richness indices are highly, generally, or fairly similar to comparison site.	HBI, EPT, and taxa richness indices are not similar to comparison site.**
Fish Community	Fish Community Data Available	IBI score either highly, generally, or fairly similar; general presence of sensitive and indicator species.	IBI score not similar; absence of sensitive and indicator species.**

\* - 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).

**Specific Standards**

**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 water body 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 water body will not be listed as impaired.

**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	NA	FS	1
	NA	S	FS	1
	S	S	NA	1
	NA	S	NA	1
	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

**ASSESSMENT CRITERIA FOR OZARK HIGHLANDS ECOREGION STREAMS**

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE <sup>1</sup>	29 C		< = 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (mg/l)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi <sup>2</sup>	6	2	< 5 samples or < = 10%		>10%	
10-100 mi <sup>2</sup>	6	5	< 5 samples or < = 10%		>10%	
> 100 mi <sup>2</sup>	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 <sup>1</sup>	31 C		< = 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (mg/l)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi <sup>2</sup>	6	2	< 5 samples or < = 10%		>10%	
> 10 mi <sup>2</sup>	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 <sup>1</sup>	31 C		< =10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (mg/l)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi <sup>2</sup>	5	2	< 5 samples or < = 10%		>10%	
10-150 mi <sup>2</sup>	5	3	< 5 samples or < = 10%		>10%	
151-400 mi <sup>2</sup>	5	4	< 5 samples or < = 10%		>10%	
>400 mi <sup>2</sup>	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 <sup>1</sup>	30 C		< = 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (mg/l)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi <sup>2</sup>	6	2	< 5 samples or < = 10%		>10%	
>10 mi <sup>2</sup>	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 <sup>1</sup>	30 C		< = 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (mg/l)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi <sup>2</sup>	5	2	< 5 samples or < = 10%		>10%	
10-500 mi <sup>2</sup>	5	3	< 5 samples or < = 10%		>10%	
>500 mi <sup>2</sup>	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 (springwater influenced)**

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE <sup>1</sup>	30 C		< = 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (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 <sup>1</sup>	30 C		< = 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (mg/l)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi <sup>2</sup>	5	2	< 5 samples or < = 10%		>10%	
10-100 mi <sup>2</sup>	5	3	< 5 samples or < = 10%		>10%	
>100 mi <sup>2</sup>	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 <sup>1</sup>	32 C		< =10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (mg/l)	Primary	Critical	Primary	Critical	Primary	Critical
<10 mi <sup>2</sup>	5	2	< 5 samples or < = 10%		>10%	
10-100 mi <sup>2</sup>	5	3	< 5 samples or < = 10%		>10%	
>100 mi <sup>2</sup>	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 <sup>1</sup>						
DAM #1 TO MOUTH	32 C		< =10%		>10%	
OZARK HIGHLANDS	29 C		< = 10%		>10%	
TROUT WATERS	20 C		< = 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (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 <sub>4</sub> /TDS <sup>1</sup>						
Mouth to Dam #3	20/60/430		< =10%		>10%	
DAM #3 TO MO. LINE <sup>1</sup>	20/20/180		< =10%		>10%	
MO. LINE TO HEADWATERS <sup>1</sup>	20/20/160		< =10%		>10%	
TURBIDITY						
Base Flows - Delta	45 NTU		< = 25%		>25%	
All Flows - Delta <sup>2</sup>	84 NTU		< = 20%		>20%	
Base Flows - Ozark Highlands	10 NTU		< = 25%		>25%	
All Flows - Ozark Highlands <sup>2</sup>	17 NTU		< = 20%		>20%	

**ASSESSMENT CRITERIA FOR ST. FRANCIS RIVER**

PARAMETER	STANDARD		SUPPORT		NON-SUPPORT	
			DATA POINTS EXCEEDING CRITERIA			
TEMPERATURE <sup>1</sup>	32 C		<= 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (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 <sub>4</sub> /TDS <sup>1</sup>						
MOUTH TO 36 <sup>0</sup> N. LAT. <sup>1</sup>	10/30/330		<=10%		>10%	
36 <sup>0</sup> N. LAT. TO 36 <sup>0</sup> 30'N LAT. <sup>1</sup>	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 <sup>1</sup>	32 C		<= 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (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 <sub>4</sub> /TDS <sup>1</sup>						
MOUTH TO L&D #7 <sup>1</sup>	250/100/500		<=10%		>10%	
L&D #7 TO L&D #10 <sup>1</sup>	250/100/500		<=10%		>10%	
L&D #10 TO OK LINE <sup>1</sup>	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 <sup>1</sup>	32 C		<= 10%		>10%	
L. MISSOURI TO S.LINE	32 C		<=10%		>10%	
ABOVE L. MISSOURI	30 C		<=10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (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 <sub>4</sub> /TDS <sup>1</sup>						
LA LINE TO CAMDEN <sup>1</sup>	160/40/350		<=10%		>10%	
CAMDEN TO CARPENTER DAM <sup>1</sup>	50/40/150		<=10%		>10%	
CARPENTER DAM TO HEADWATERS <sup>1</sup>	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 <sup>1</sup>	32 C		<= 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (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 <sub>4</sub> /TDS <sup>1</sup>						
OK LINE TO CONFLUENCE WITH LITTLE RIVER <sup>1</sup>	250/200/850		<=10%		>10%	
LITTLE RIVER TO LA LINE <sup>1</sup>	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 <sup>1</sup>	32 C		< = 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (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 <sub>4</sub> /TDS <sup>1</sup>						
LA LINE TO AR RIVER <sup>1</sup>	60/150/425		< =10%		>10%	
AR RIVER TO MO LINE <sup>1</sup>	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 <sup>1</sup>	32 C		< = 10%		>10%	
DISSOLVED OXYGEN <sup>1</sup> (mg/l)	5		< 5 samples or < = 10%		>10%	
pH	6 to 9 standard pH units		< =10%		>10%	
CL/SO <sub>4</sub> /TDS <sup>1</sup>	205/205/500		< =10%		>10%	
TURBIDITY						
Base Flows	25 NTU		< = 25%		>25%	
All Flows	45 NTU		< = 20%		>20%	

**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, which ever is greater, fail to meet the minimum dissolved oxygen standard, the water body will be listed as not attaining the dissolved oxygen standard.

#### **Reg. 2.506 - 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 water body 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 *Escherichia 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. Data sets 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 waterbodies as water quality impaired using fecal coliform data. These listings were, and will be retained unless additional data for *E. coli* becomes available. If data shows the current *E. coli* criteria are met, the waterbody will be de-listed.

### Statewide Bacteria Assessment Criteria

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

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 water body will be listed as impaired for that criterion.

### Statewide Metals Assessment Criteria

	Acute <sup>3</sup>	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”.

**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 waterbodies with site specific criteria are made according to the specific values listed in Reg. 2.511(A). For those waterbodies 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.

**Statewide Minerals Assessment Criteria**

Parameter	Standard	Support	Non-Support
Site Specific Standards (mg/L)	See Reg. 2.511(A)	< =10%	>10%
CL/SO <sub>4</sub> /TDS <sup>1</sup>	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.

**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

### 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 water body will be listed as not attaining ammonia toxicity standards.

#### 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

### 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.

#### Statewide Water Supply Assessment Criteria

PARAMETER	STANDARD	SUPPORT	NON-SUPPORT
CL/SO <sub>4</sub> /TDS <sup>1</sup>	250/250/500	<=10%	>10%

### REOCCURRING ISSUES

The evaluation of the fisheries designated use (aquatic life) as impaired based solely on water chemistry data instead of biological data has become an issue. Past and recent studies conducted by ADEQ (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. This list has over 130 stream segments, over 2100 stream miles, listed as not supporting the fisheries designated use; yet only five of these stream segments, less than 25 stream miles, have biological data to support the listing.

Many streams in the state have low pH values and are unable to meet the minimum pH standard of 6 standard units. Arkansas's pH standards, adopted in the 1970's, 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 establishes a nationwide exceedance criterion. Thus, neither Arkansas's current pH standards, nor the assessment criteria, can adequately evaluate natural occurring conditions.





### Category 4a Waters: Impaired Waterbodies (Lakes) With Completed TMDLs.

LAKE NAME	HUC	LAKE TYPE	PLNG SEG	ACRES	COUNTY	ASSESS	FISH	AQUATIC	PRIMARY	ECONDAR	DRINKING	AGRI &	SOURCE			CAUSE		
							COMSUMF	LIFE	CONTACT	CONTACT	WATER	INDUSTRY	1	2	3	1	2	3
Columbia	11140203	E	1A	3000	Columbia	M	N						UN			HG		
First Old Rive	11140201	D	1B	240	Miller	M		N					UN			NU		
Grand	8050002	E	2A	900	Chicot	M		N					UN			NU		
Grays	8040204	NC	2C	36	Cleveland	M	N						UN			HG		
Monticello	8040204	B	2C	1520	Drew	M	N						UN			HG		
Winona	8040203	A	2C	715	Saline	M	N						UN			HG		
Ouachita River Oxbows below Camden	8040202		2D		Ashley Calhoun Union Bradley Ouachita	M	N						UN			HG		
Big Johnson	8040201	NC	2D	49	Calhoun	M	N						UN			HG		
Felsenthal	8040202	E	2D	14,000	Bradley	M	N						UN			HG		
Cove Creek	11110202	B	3H	42	Logan	M	N						UN			HG		
Nimrod	11110206	E	3E	3550	Yell	M	N						UN			HG		
Dry Fork	11110206		3E	90	Perry	M	N						UN			HG		
Horseshoe	8020203	E	4A	1200	Crittenden	M		N					UN			NU		
Frierson	8020302	C	4B	335	Greene	M		N					UN			SI		
Johnson Hole	11010014	A	4E		Van Buren	M	N						UN			HG		
Spring	11110204	B	3G	82	Yell	M	N						UN			HG		
Old Town	8020302	D	5A	900	Phillips	M		N					UN			NU		
Bear Creek	8020205	C	5B	625	Lee	M		N					UN			NU		
Mallard	8020204	D	5C	300	Mississippi	M		N					UN			NU		











**Category 5 Waters: Arkansas Water Quality Limited Waterbodies (Lakes) 2010 303(d) List**

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

## **NOTICE OF PUBLIC HEARING, COMMENT PERIOD**

The Arkansas Department of Environmental Quality (ADEQ) will hold a public hearing at 2:00 p.m. on February 24, 2010 to receive comments on the Agency's proposed 2010 Impaired Waterbodies List (commonly called the 303d List). The hearing will be conducted in the Commission Room at the ADEQ headquarters building; 5301 Northshore Drive, North Little Rock.

Prior to accepting formal public comments at the hearing, ADEQ Water Division staff will present a short program discussing the proposed 2010 303d List. A period of time will also be set aside for informal discussion and questions and answers before the formal public comment period begins.

The 303d List is developed by ADEQ every two years under provisions of Section 303d of the Federal Clean Water Act. ADEQ assesses water quality monitoring data from numerous locations around the state and utilizes a comprehensive assessment methodology to determine which waters are not meeting their designated uses as listed in the Arkansas Water Quality Standards (Regulation No. 2 of the Arkansas Pollution Control and Ecology Commission).

Water quality data from stream and lake sampling sites were considered during the development of the proposed 2010 303d List. These sampling stations were either part of ADEQ's statewide water quality monitoring network, special surveys conducted by ADEQ, or sites sampled by U.S. National Park Service within the Buffalo River Watershed. Other water quality data from federal, state, and local government agencies, as well as from private entities, both within Arkansas and from adjoining states, were also evaluated during development of the proposed list.

A complete listing of impaired waterbodies can be found in the tables following the narrative of the draft 303d List. Copies of the list are available on the ADEQ's Internet web site at [www.adeq.state.ar.us](http://www.adeq.state.ar.us) or can be obtained by contacting Jim Wise in the ADEQ Water Division; telephone, 501-682-0663; e-mail, [wise@adeq.state.ar.us](mailto:wise@adeq.state.ar.us).

Copies of the proposed 2010 Arkansas 303d List also are available for public inspection during normal business hours at the ADEQ's Public Outreach and Assistance Division, located on the second floor of the ADEQ headquarters building, 5301 Northshore Drive, North Little Rock. In addition, copies of the list are available for public review during normal business hours at ADEQ information depositories located in public libraries at Arkadelphia, Batesville, Blytheville, Camden, Clinton, Crossett, El Dorado, Fayetteville, Forrest City, Fort Smith, Harrison, Helena, Hope, Hot Springs, Jonesboro, Little Rock, Magnolia, Mena, Monticello, Mountain Home, Pocahontas, Russellville, Searcy, Stuttgart, Texarkana, and West Memphis; in campus libraries at the University of Arkansas at Pine Bluff and the University of Central Arkansas at Conway; and in the Arkansas State Library located on the State Capitol grounds at Little Rock.

Oral and written comments on the proposed 2010 303d List will be accepted at the public hearing, but written statements are preferred in the interest of accuracy. In addition, written statements will be considered if received no later than 4:30 p.m., March 10, 2010. Written statements should be sent to: Jim Wise, Arkansas Department of Environmental Quality, Water Division, 5301 Northshore Drive, North Little Rock, AR 72118; e-mail: wise@adeq.state.ar.us.

Proposed revisions to the 2010 Arkansas 303d List will be incorporated into the 2010 Arkansas Integrated Water Quality Monitoring and Assessment Report (commonly called the 305b Report), after approval by the ADEQ Director and the Region 6 Office of the U.S. Environmental Protection Agency (EPA).

Dated this 4th day of February, 2010,

Teresa Marks, Director,  
Arkansas Department of Environmental Quality