Exhibit E

Economic Impact/Environmental Benefit Analysis

Pursuant to Reg.8.812

ECONOMIC IMPACT/ENVIRONMENTAL BENEFIT ANALYSIS

Answer to best of the proponent's ability, as required by APC&EC Regulation 8.812

STEP 1: DETERMINATION OF ANALYSIS REQUIREMENT
(to be included in petition to initiate rulemaking)

The Arkansas Pollution Control and Ecology Commission's (Commission) Regulation No. 8 requires the Commission to duly consider the economic impact and the environmental benefit of any rule or regulation prior to promulgation. By Act 143 of 2007, the Governor has directed that impacts to small businesses be analyzed prior to adoption of regulations. Furthermore, the Arkansas Legislative Council requires the submission of a Financial Impact Statement and Questionnaire for Filing Proposed Rules and Regulations with the Arkansas Legislative Council and Joint Interim Committee with proposed regulation changes. The following procedures are outlined to provide clarity in the requirements of these various impact statements.

1. Prepare and submit the Financial Impact Statement and Questionnaire for Filing Proposed Rules and Regulations with the Arkansas Legislative Council and Joint Interim Committee required by the Arkansas Legislative Council for all proposed rulemakings.

2. The following analysis is necessary for the Commission to consider the economic impact and environmental benefit of any proposed rule or regulation. This Economic Impact/ Environmental Benefit Analysis ("Analysis") must be prepared by the proponent of the rulemaking initiated before the Commission based upon information reasonably available. If a rulemaking proposes to alter or amend an existing Commission rule, the Analysis shall be restricted to the economic impact and environmental benefits of the proposed changes. This Analysis must be included in the Petition to Initiate Rulemaking before the Commission for all regulatory changes, unless the proposed rule is exempt for one or more of the following reasons:

- The proposed rule incorporates or adopts the language of a federal statute or regulation without substantive change;*
- The proposed rule incorporates or adopts the language of an Arkansas state statute or regulation without substantive change;
- The proposed rule is limited to matters arising under Regulation No. 8 regarding the rules of practice or procedure before the Commission;
- The proposed rule makes only *de minimis* changes to existing rules or regulations, such as the correction of typographical errors or the renumbering of paragraphs or sections; or
- The proposed rule is an emergency rule that is temporary in duration.

If the proposed rulemaking does not require the following Analysis due to one or more of the exemptions listed above, state in the Petition to Initiate Rulemaking which exemptions apply and explain specifically why each is applicable.

**If a proposed rule incorporates or adopts the language of a state or federal statute or regulation but does include one or more substantive change, then the Analysis shall address only the substantive changes.*

STEP 2: THE ANALYSIS
(to be included in petition to initiate rulemaking, if required)

Directions for Analysis Completion:

1. Answer all questions, unless an exemption applies, using information reasonably available.
2. List source(s) for any data used in an answer. If a response cannot be provided to any question because information is not reasonably available, describe the sources consulted or steps taken in an effort to obtain the information in question.
3. Describe any assumptions used.
4. Complete the Economic Impact Statement, if applicable, as required by Act 143 of 2007.
5. Highlight on the attached map the boundary of the geographical area impacted by the proposed rule, unless the proposed rule applies to the entire state.

This Analysis shall be available for public review along with the proposed rule in the public comment period. The Commission shall compile a response to comments demonstrating a reasoned evaluation of the relative economic impact and environmental benefits.

ARKANSAS POLLUTION CONTROL & ECOLOGY COMMISSION
ECONOMIC IMPACT/ENVIRONMENTAL BENEFIT ANALYSIS

Rule Number & Title: Regulation No. 2, Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas

Petitioner: Arkansas Department of Environmental Quality

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Date Analysis Prepared: January 29, 2013

Pursuant to APC&EC Reg.8.812(A)(4), the following Regulations are exempt from this economic impact and environmental benefit analysis (hereinafter "Analysis") because "the proposed rule makes only *de minimis* changes to existing rules or regulations, such as the correction of typographical errors or the renumbering of paragraphs or sections":

Reg. 2.101 Authority
Reg. 2.105 Environmental Improvement Projects
Reg. 2.106 Definitions

- ***a)*** All defined words were bolded for uniformity.
- ***b)*** Definitions for: 304(a) guidance, algae, all flows, base flows, chronic toxicity, department, design flow, designated uses, *Escherichia coli*, existing uses, fishable/swimmable, human health criteria, long term average flow, milligrams per liter, mixing zone, nephelometric turbidity unit (NTU) (previously NTU (Nephelometric Turbidity Unit), primary season critical flow, Q7-10, State of Arkansas Continuing Planning Process (previously Continuing Planning Process (CPP)), waterbodies, waterways, waters, water effects ratio (WER), and zone of initial dilution (ZID)

Reg. 2.202 High Quality Waters
Reg. 2.203 Outstanding Resource Waters
Reg. 2.204 Thermal Discharges
Reg. 2.303 Use Attainability Analysis
Reg. 2.306 Procedures for Removal of Any Designated Use Except Fishable/Swimmable...
Reg. 2.308 Site Specific Criteria
Reg. 2.309 Temporary Variance
Reg. 2.310 Procedure for the Removal of the Designated Use of Extraordinary Resource...
Reg. 2.311 Procedure for the Addition of the Designate Use of Extraordinary Resource...
Reg. 2.403 Methods
Appendix E
Appendix B
Appendix F

Amendments to the following Regulations are not exempt from this Analysis and are analyzed below:

Reg. 2.104 Policy for Compliance
Reg. 2.106 Definitions
Definitions for: aquatic life (previously fisheries), bioaccumulation, conventional pollutants, criterion continuous concentration (CCC), criterion maximum concentration (CMC), critical flows, groundwater, harmonic mean flow, headwater, natural background, nonpoint source, and seasonal aquatic life
Reg. 2.302 Designated Uses
Reg. 2.304 Physical Alteration of Habitat
Reg. 2.401 Applicability
Reg. 2.402 Nuisance Species
Reg. 2.404 Mixing Zones
Reg. 2.405 Biological Integrity
Reg. 2.409 Toxic Substances
Reg. 2.501 Applicability
Reg. 2.502 Temperature
Reg. 2.503 Turbidity
Reg. 2.504 pH
Reg. 2.505 Dissolved Oxygen
Reg. 2.507 Bacteria
Reg. 2.508 Toxic Substances
Reg. 2.509 Nutrients
Reg. 2.510 Oil and Grease
Reg. 2.511 (A) Mineral Quality
Reg. 2.511 (B) Mineral Quality
Reg. 2.511 (C) Mineral Quality
Reg. 2.512 Ammonia
Appendix A – Designated Uses, Specific Standards and Maps of Waters of the State...
Appendix C – Scientific Names of Aquatic Biota
Appendix D – List of Current Extraordinary Resource Waters, Ecologically Sensitive...

2A. ECONOMIC IMPACT

1. Who will be affected economically by this proposed rule?
State: a) the specific public and/or private entities affected by this rulemaking, indicating for each category if it is a positive or negative economic effect; and b) provide the estimated number of entities affected by this proposed rule.
In general, these proposed water quality standards revisions will have a positive economic effect on Arkansas's public and private industry, tourism, and recreational and domestic water suppliers by offering continued protection of the State's water resources. Arkansas has approximately one-half million acres of surface water, with some 13,490 miles of streams and rivers and more than 500,000 acres of lakes. As per the 2012 Integrated Water Quality Monitoring and Assessment Report (305(b)), over 62% of Arkansas's assessed surface waters are fully supporting their designated uses (Table 1).

Table 1. Designated Use & Water Quality Standards Support in Arkansas

Degree of Use Support	Assessed Total (miles)	Percentage
Supporting all assessed uses	6168.7	62.75%
Not supporting a use	3661.2	37.25%
Total Waters Assessed	9829.9	

Economic Earnings from Clean Water

The benefits of implementing the Clean Water Act are numerous. Recreational, industrial, and municipal uses are all dependent upon clean, safe water. A conservative estimate of the benefit of implementing the Clean Water Act and thus achieving high quality water, can be made by subtracting fishing from the Agriculture, Forest, and Fishing category, and considering a marginal value of 10 percent (10%) for high quality water. This estimate is used in the calculations below.

Tourism and Recreation

Over $5.5 billion in revenue was generated for the State of Arkansas in 2010 through tourism. The conservative estimate for tourism revenue that directly benefited from implementation of the Clean Water Act would be $550 million.

According to the U.S. Fish and Wildlife Service (2012), in 2011 just over $1.7 billion were realized in Arkansas for total wildlife related expenditures (hunting, fishing, and wildlife watching)(Table 2). The quality of all these recreational activities is directly related to the quality of Arkansas's water resources. The conservative estimate for wildlife related expenditure revenue that directly benefited from implementation of the Clean Water Act would be $173 million.

Table 2. Expenditures on Fishing, Hunting, and Wildlife Watching in Arkansas, 2011.

Fishing expenditures	$495,584,000
Hunting expenditures	$1,021,379,000
Wildlife watching	$216,074,000
Total	$1,733,037,000

Aquaculture

Nationally, Arkansas is an important state for aquaculture. Arkansas ranks third in the U.S. in catfish production, and leads the nation in baitfish, goldfish, sport-fish, largemouth bass, hybrid striped bass fry, and carp production. According to the University of Arkansas at Pine Bluff, Arkansas has a $167 million aquaculture industry with an economic value of over $1.2 billion. The conservative estimate of the economic benefit from the aquaculture industry in the State related to implementation of the Clean Water Act would be $120 million.

Fisheries is another economically important industry for Arkansas, with three National Fish Hatcheries (NFH). According to the U.S. Fish and Wildlife Service website, Norfork NFH generates $5.86 in tax revenue for each $1 of budget expenditures; additionally, for every $1 of operational budget spent, $95 is put back into the economy. For every tax dollar expended for recreational fish production at Mammoth Spring NFH, $12 of net economic value is created, which amounts to an economic yield of more than $1.5 million every year. For Greers Ferry NFH, every $1 of hatchery operational budget spent returns $113 back into the economy.

Water-Critical Industries

The principal industries in Arkansas are manufacturing, agriculture, forestry, business services, and tourism (Table 3); these industries accounted for 12.5% of Arkansas's general revenue in 2010, or over $12.8 billion. Arkansas's industries are dependent upon, and thus benefit from, high quality water resources. The conservative estimate for industry revenue that directly benefited from implementation of the Clean Water Act would be $1.28 billion.

Table 3: Economic Benefits from Industries in Arkansas by Category, 2010.

Industry Category	2010 Revenues (billion)	Percent Gross State Product ($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 Clean Water Act programs in Arkansas are estimated to be more than $2.123 billion (using the most current data available) (Table 4). Economic benefit calculations are conservative to account for overlap in economic sources and other variables, and may underestimate actual benefits. These estimates do not quantify other critical benefits, such as reducing the cost of water treatment for drinking water, the health effects of untreated poor quality water, etc.

Table 4: Summary of Benefits Associated with Implementing Clean Water Act Programs in the State of Arkansas.

Economic Source	Principal Activities	Economic Benefits* (Million)
Tourism	Water recreation, sightseeing, etc.	$550
Aquaculture	Propagation of sport fish	$120
Wildlife	Hunting, fishing, and wildlife watching	$173

Industry	Manufacturing, agriculture, forestry, business services, and tourism	$1280
	TOTAL	**$2123**

*Estimate based on total revenue for source.

Economic Savings from Clean Water

Water utility customers will not sustain negative economic impacts through increased costs for drinking water, if water quality standards are upheld and designated uses are maintained.

Water Treatment Costs

Water treatment costs directly impact citizens because the higher the cost of water treatment due to water quality issues the higher the cost is to the municipal user. One such issue requiring additional treatment is taste and odor (hereinafter "T&O"). Taste currently has no national primary drinking water regulations; however, USEPA has set a Secondary Maximum Contaminant Level (SMCL) for odor. Although there are not always direct discharges of the constituents that cause T&O issues to lakes and streams, exceedances of other water quality standards (due to point sources and non-point sources) create conditions which cause bacteria and/or algae to thrive and create T&O issues indirectly.

As an example, in a 2008 study by Black and Veatch for Beaver Water District, options for T&O control were investigated and costs were analyzed (Table 5). Objectionable T&O in drinking water may be caused by the presence of microbial metabolites and degradation products, anthropogenic volatile and synthetic organic compounds, and naturally occurring inorganic compounds. Numerous microbial species produce odors variously described as sweet, grassy, musty, earthy, swampy, fishy, and septic. Different methods to control the T&O were considered and a preliminary evaluation was conducted for four viable T&O control options: powdered activated carbon (PAC), granular activated carbon (GAC), ozonation, and ultraviolet (UV) with hydrogen peroxide.

Table 5: Order of Magnitude Cost

Alternative	**Capital Cost ($ million)**	**O&M Cost ($ thousand)**	**Annualized Cost ($ thousand)**	**Wholesale Rate Impact ($/1000 gal)**
PAC	60.5	1,790	6,440	0.48
Ozonation	37.7	480	4,010	0.27
PAC & Ozonation	42.2	790	4,500	0.32
UV/H2O2	83.8	1,110	8,920	0.61
PAC & UV/H2O2	65.2	1,220	6,940	0.49

For assumptions, please refer to Black and Veatch. 2008. Beaver Water District Taste and Odor Evaluation Report.

For Beaver Water District, the recommended alternative, PAC and ozonation, had capital costs of $42.2 million, annual O&M costs of $790,000, and a wholesale rate impact of $0.32 per 1000 gallons. If the cost is only applied to residential customers, the wholesale rate impact could be as high as $0.42 per 1000 gallons. With an average household usage of 6,000 gallons per month, the average bill would increase from about $21 per month to about $23.5 per month, which is about $30 per year.

Drinking water sources may have water quality issues unrelated to taste and odor. Other water quality issues may require additional treatment using coagulants, disinfectants, pH adjusters, etc. As an example, a 1997 study titled Costs of Water Treatment due to diminished water quality: a case study in Texas, found that when regional raw water contamination is present, the chemical cost of water treatment is increased by $95 per million gallons from a base of $75.

The processes needed to treat for these other water quality issues and associated costs vary (Table 6). Municipal users would save money by not having to incur the costs associated with additions to the treat plant processes.

Table 6. Water treatment chemical and costs per unit.

Chemical	Cost/unit	Use
Alum (aluminum sulfate)	0.10	coagulation
Lime	0.10	pH adjustment
Chlorine	0.10	disinfection
Polymer	3.00	coagulation
Caustic soda	0.32	coagulation
Ferric sulfate	0.18	disinfection
Activated carbon	0.58	coagulation
Ammonia	0.24	disinfection
Potassium permanganate	1.58	coagulation
Copper sulfate	0.06	disinfection
Soda Ash	0.10	pH adjustment
Sodium chlorite	0.14	disinfection

Regulation-Specific Impacts

State: a) the specific public and/or private entities affected by this rulemaking, indicating for each category if it is a positive or negative economic effect; and b) provide the estimated number of entities affected by this proposed rule.

2.104 Policy for Compliance

- ***a)*** *This proposed rulemaking will affect permitted entities with compliance schedules that are 1) seeking site specific criteria development or 2) under a plan approved by the Department. This proposed rule could lessen the economic impact on entities under Department compliance schedules.*
- ***b)*** *There are currently 250 individual National Pollutant Discharge Elimination System (NPDES) permitted entities that have compliance schedules that could potentially be affected by this proposed rule.*

2.106 Definitions

Critical flows definition:

- ***a)*** *1. Specifying a flow of Q7-10 for those streams with site specific minerals criteria developed by ADEQ will not affect any specific public and/or private entity. Q7-10 flow is currently utilized for these waters.*

2. Specifying the site specific flow stated in criteria documentation for those streams with site specific minerals criteria developed by a third party could result in a reevaluation of permit limitations based upon the site specific flow stated in the criteria documentation. This may have a positive or negative impact depending on the flow utilized to calculate current permit limits.

3. Specifying the use of harmonic mean flow when utilizing the ecoregion reference stream minerals values could result in a reevaluation of permit limitations depending on the flow utilized to calculate current permit limits. This may have a positive or negative impact.

4. Specifying the use of Q7-10 when utilizing the domestic water supply minerals criteria could result in a reevaluation of permit limitations depending on the flow utilized to calculate current permit limits. This may have a positive or negative impact.

b) *1. There will be no specific entities affected by this proposed rule.*

2., 3., 4. There are approximately 43 entities that have "report only" requirements for at least one minerals parameter in their individual NPDES permits. There are approximately 44 entities that have limits for at least one mineral parameter in their individual NPDES permits.

2.106 Definitions

a) *The definitions for aquatic life, bioaccumulation, conventional pollutants, criterion continuous concentration, criterion maximum concentration, ground water, ground water under the direct influence of surface water, harmonic mean flow, headwater, maximum contaminant level, natural background, nonpoint source, and seasonal aquatic life will not affect any specific public or private entities; these revisions will not lead to stricter permit limits.*

b) *There will be no specific entities affected by this proposed rule.*

2.302 Designated Uses

a) *This proposed rulemaking will not affect any specific public and/or private entities; the reference to Appendices A and D in this section refers to previously approved Site Specific Designated Use Variations. The revision from "Fisheries" use to "Aquatic Life" use and the revision from the term "aquatic life" to "aquatic biota" will add clarification to this designated use.*

b) *There will be no specific entities affected by this proposed rule.*

2.304 Physical Alteration of Habitat

a) *This proposed rulemaking will not affect any specific public and/or private entities; it reverts back to the language previously approved by the EPA in 2004.*

b) *There will be no entities affected by this proposed rule.*

2.401 Applicability

a) *This proposed rulemaking will not affect any specific public and/or private entities; the additional text states that site specific criteria are noted in Appendix A.*

b) *There will be no entities affected by this proposed rule.*

2.402 Nuisance Species

a) *This proposed rulemaking will have no added burden to permitted entities. Revision from the term "aquatic life" to "aquatic biota" in this rule will eliminate potential confusion with the Aquatic Life Designated Use.*

b) *There will be no specific entities affected by this proposed rule.*

2.404 Mixing Zones

a) *1. This proposed rule may affect those facilities whose permits utilize a mixing zone for pH and do not fall within the exemptions for publicly owned treatment works ("POTWs") under 40 C.F.R. § 133.102(c).*
2. This proposed rulemaking may affect public or private entities that discharge a substance that is bioaccumulative, persistent, carcinogenic, mutagenic, or teratogenic and whose permits utilizes a mixing zone for these parameters.
3. This proposed rulemaking would potentially affect those public and private entities with water supply intake or public water supply wells that have been determined by the state to be ground water under the direct influence of surface water connected to the mixing zone.

b) *1. At this time, ADEQ is unaware of any facilities whose permits utilizes a mixing zone for pH and do not fall within the exemptions for publicly owned treatment works ("POTWs") under 40 C.F.R. § 133.102(c). (Currently there are 33 facilities whose permit's utilize a mixing zone for pH are exempt under 40 C.F.R. § 133.102(c)).*
2. At this time, ADEQ is unaware of any facilities whose permits utilizes a mixing zone when discharging a substance that is bioaccumulative, persistent, carcinogenic, mutagenic, or teratogenic and whose permits currently consider a mixing zone.
3. At this time, ADEQ is unaware of any facilities with water supply intake or public water supply wells that have been determined by the state to be ground water under the direct influence of surface water connected to the mixing zone.

2.405 Biological Integrity

a) *This proposed rulemaking will have no added burden to permitted entities. The revision of response variable requirements will not lead to stricter permit limits. As previously written, the only comparison between communities that can currently be made is with communities that have similar aquatic species with similar abundances. Thus, comparisons between impacted and non-impacted sites are not permissible. This is clearly not the intent of the regulation.*

The removal of the words "collect and" from the last sentence is in direct compliance with 40 CFR 130.7(5) "Each state shall assemble and evaluate all existing and readily available water quality-related data..." Maintaining this language could be interpreted as requiring ADEQ to perform all biological assessments as they relate to standards changes. That interpretation would limit the amount of biological data available for use with assessments.
Every two years ADEQ solicits data from approximately 94 entities when updating the 303(d) list and 305(b) report.

b) *There will be no specific entities affected by the proposed rule.*

2.409 Toxic Substances

a) This proposed rulemaking will have no added burden to permitted entities. Revision from the term "aquatic life" to "aquatic biota" in this rule will eliminate potential confusion with the Aquatic Life Designated Use.

b) There will be no specific entities affected by this proposed rule.

2.501 Applicability

a) This proposed rulemaking will not affect any specific public and/or private entities; the additional text states that site specific criteria are noted in Appendix A.

b) There will be no entities affected by this proposed rule.

2.502 Temperature

a) This proposed rulemaking will not affect any specific public and/or private entities. It will allow the regulation to more accurately reflect ADEQ's Assessment Methodology. ADEQ will be positively affected in that there will no longer be inconsistency concerning the assessment of lake temperature data collected in various lake layers.

b) ADEQ will be the only entity affected.

2.503 Turbidity

a) This proposed rulemaking will not affect any specific public and/or private entities. It will allow the regulation to more accurately reflect ADEQ's Assessment Methodology. ADEQ will be positively affected in that there will no longer be inconsistency concerning the assessment of turbidity.

b) ADEQ will be the only entity affected.

2.504 pH

a) This rulemaking will affect entities permitted or seeking permits to discharge into waters that can be shown to have natural background conditions resulting in pH values either less than or greater than the criteria listed. No negative effects are anticipated from this rulemaking; however, positive effects are anticipated in that permit limits and assessment criteria would more accurately reflect natural conditions and not be unnecessarily restrictive.

b) Currently no permits rely on this provision for pH limits.

2.505 Dissolved Oxygen

a) This proposed rulemaking will have no added burden to permitted entities; it only reformats the regulation for ease of reading. Revision from the term "aquatic life" to "aquatic biota" in this rule will eliminate potential confusion with the Aquatic Life Designated Use. This proposed rule will more accurately reflect ADEQ's Assessment Methodology. ADEQ will be positively affected in that there will no longer be inconsistency concerning the assessment dissolved oxygen data collected in various lake layers.

b) ADEQ will be the only entity affected.

2.507 Bacteria

a) This proposed rulemaking will not affect any specific public and/or private entities; it

only reformats the regulation for ease of reading.

b) *There will be no entities affected by this proposed rule.*

2.508 Toxic Substances

a) *This proposed rulemaking will not affect any specific public and/or private entities; it only removes "shall not exceed" type language. Based on recent litigation, EPA has indicated that language such as "shall not exceed" may not be appropriate for standards when a state's assessment methodology allows for more than one exceedance. This proposed rule will more accurately reflect ADEQ's Assessment Methodology.*

b) *ADEQ will be the only entity affected.*

2.509 Nutrients

a) *This proposed rulemaking will affect entities permitted or seeking permits to discharge into Beaver Lake. Entities with individual NPDES permits may receive more stringent permit monitoring and/or limits. However, this proposed rule will produce positive economic benefits for customers that use Beaver Lake as a public drinking water source. If taste and odor events were to continue, causing ozonation and activated carbon treatments to be added, water customers would see a wholesale rate increase of $0.32 per thousand gallons. Added protection at this time may negate the need for further treatment practices in the future.*

b) *There are currently four entities with individual NPDES permits that discharge into Beaver Lake. There are over 400,000 people and industries that rely on Beaver Lake as a drinking water source.*

2.510 Oil and Grease

a) *This proposed rulemaking will not affect any specific public and/or private entities; it only removes "shall not exceed" type language.*

b) *There will be no entities affected by this proposed rule.*

2.511 Minerals Quality

2.511(A)

a) *1. The addition of the number of samples and the exceedance criteria will not affect any specific public and/or private entities. This proposed rule will more accurately reflect ADEQ's Assessment Methodology and will eliminate potentially confusing language.*

2. Splitting the table into two tables one of site specific standards developed by ADEQ and one of site specific standards developed by a third party will not affect any specific public or private entities. Splitting the table will help to avoid confusion when permits are written that discharge into one of the streams on the tables.

3. The addition of specific lock and dam names, "state line" and US or State highways will not affect any specific public and/or private entities. These revisions will clarify current stream descriptions.

4. This proposed rulemaking will affect the Bayou Meto Water District and any future entities permitted or seeking permits to discharge into the portion of Bayou Two Prairie

that flows thru the Smoke Hole Natural Area, which is designated as an ERW.

b) *1. ADEQ and EPA will be the only entities affect by proposed rule.*
2. ADEQ will be the only entity affect by the table split.
3. There will be no entities affected by this proposed rule.
4. Currently there are no entities that discharge directly into the segment of Bayou Two Prairie that is designated as an ERW. There are five entities with individual NPDES permits that discharge to portions of Bayou Two Prairie upstream of the ERW designated segment.

2.511(B)

a) *This rulemaking will not affect any specific public and/or private entities. The April 23, 2004 version of Regulation No. 2, as promulgated by the Commission and approved by EPA, contained a table of minerals values organized by ecoregion and text describing how to use the table to calculate ecoregion reference stream values. In the October 26, 2007 version of Regulation No. 2, as promulgated by the Commission, these ecoregion reference stream values were calculated in the table (in an effort to make the table easier to interpret); however, the text describing how to calculate the ecoregion reference stream values was inadvertently left in the document. Therefore, EPA disapproved of the revised (Calculated Ecoregion Reference Stream Values (Regulation 2.511(B)) table because it retained the previous text describing the calculations along with the updated table and effectively revised ecoregion chloride, sulfate, and total dissolved solids criteria associated with Regulation 2.511 to less stringent concentrations. EPA suggested that the text after the first sentence be removed.*

b) *The implementation of Reg. 2.511(B) has not changed; there will be no entities affected by this proposed rule.*

2.511(C)

a) *This proposed rulemaking will not affect any specific public and/or private entities. It clarifies that the values in 2.511(C) are criteria, not just limits and that exceptions to this rule must follow both Regs.2.306 and 2.308.*

b) *There will be no entities affected by this proposed rule.*

2.512 Ammonia

a) *This proposed rulemaking will not affect any specific public and/or private entities; it only removes "shall not exceed"-type language.*

b) *There will be no entities affected by this proposed rule.*

Appendix A

a) *1. Revisions to Appendix A maps will make the document easier to interpret and make use of updated GIS data. This proposed rulemaking will not negatively affect any specific public and/or private entities.*
2. The identification of threatened and endangered species found in those segments currently designated as Ecologically Sensitive Waterbodies ("ESW") will aid ADEQ and other state agencies in protecting the aquatic habitat for those species protected under the ESW designated use.

3. "Aquatic life use" more accurately labels the designated use that "provides for the protection and propagation of fish, shellfish, and other forms of aquatic biota."
4. The additions to the headings and the addition of footnotes will make the appendix easier to interpret regarding site specific designated uses and standards.
5. The addition of "state line", neighboring state names, and United States or Arkansas highways will not affect any specific public and/or private entities. These revisions will clarify current stream descriptions.

b) *There will be no entities affected by this proposed rule.*

Appendix C

a) *This proposed rulemaking will have no added burden to permitted entities. Currently, only the common names of aquatic species, whose habitat is protected under the designated use of Ecologically Sensitive Waterbody, are listed in Appendix A. Usage of common names can vary throughout a species range; therefore, notation of the scientific name will add clarity to the ESW designation.*

b) *This list will aid ADEQ and other state agencies in the review of ESWs, and the threatened and endangered species whose habitat is protected under the designated use.*

Appendix D

a) *This proposed rulemaking will have no added burden to permitted entities. Currently, Extraordinary Resource Waters, Natural and Scenic Waterways, and Ecologically Sensitive Waterbodies are listed and depicted throughout Appendix A. This proposed rule adds a list (in one location) of all of the ERWs, NSWs, and ESWs in the State.*

b) *This list will aid ADEQ and other state agencies in the review of the ERW, NSW, and ESW designated uses.*

Sources and Assumptions (for all of the above):

Attachment 1*: State of Arkansas 2012 Integrated Water Quality Monitoring and Assessment Report: Part II – Chapter 3 – Cost/Benefit Analysis*

Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas as revised, effective April 23, 2004.

Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas as revised, effective August 26, 2011.

Integrated Compliance Information System – NPDES

EPA Comments for State Consideration for the 2010 Triennial Revision of Regulation No. 2: Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas, received August 28, 2009.

Beaver Water District Taste and Odor Evaluation Report, prepared by Black & Veatch (2008)

Beaver Lake Site-Specific Water Quality Criteria Development: Recommended Criteria, prepared by FTN-Associates, Ltd., February 8, 2008

http://www.bwdh2o.org/

2010 Integrated Water Quality Monitoring and Assessment Report, Prepared pursuant to Sections 305(b) and 303(d) of the Federal Water Pollution Control Act

2012 Integrated Water Quality Monitoring and Assessment Report, Prepared pursuant to Sections 305(b) and 303(d) of the Federal Water Pollution Control Act

TMDLS for Dissolved Oxygen for White River below Bull Shoals Dam and North Fork River below Norfork Dam. 2009. FTN Associates, Ltd.

U. S. Fish and Wildlife Service. 2012. 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. State Overview.

http://www.fws.gov/greersferry/ *(Greers Ferry data)*

http://www.fws.gov/norfork/ *(Norfork data)*

U.S. EPA Record of Decision: Regulation No. 2: Regulation establishing Water Quality Standards for Surface Waters of the State of Arkansas, received January 24, 2008.

2. What are the economic effects of the proposed rule? State: 1) the estimated increased or decreased cost for an average facility to implement the proposed rule; and 2) the estimated total cost to implement the rule.

2.104 Policy for Compliance

1) *This proposed rule would decrease the cost for an average facility that is completing site specific criteria development or is under a plan approved by the Department by designating the requirements for an exception to a three year compliance schedule. Providing for extended compliance schedules would promote the use of monies that might be assessed as fines to be applied to compliance measures. Fines associated with enforcement action can range from a base of $50 for a minor noncompliance event to a base of over $9,600 for a major noncompliance event.*
2) *There will be no cost to permitted entities to implement the rule. Any penalty funds foregone by ADEQ will be offset by continued compliance with approved schedules and, ultimately, achievement of compliance with applicable water quality standards.*

2.106 Definitions

Critical flows definition

1) *The estimated costs associated with collecting the flow data necessary to calculate the harmonic mean flow for a receiving waterbody ranges from $10,000 to $18,000.*

The costs associated with updating facilities in order to meet stricter limits due to the potential differences in facility design can vary greatly. These differences could include, but are not limited to: type of discharge; chemicals, processes, and mechanics used during production;

characteristics of receiving waterbody; age and size of facility.

If a stormwater construction permit is needed as a result of the proposed rule, the facility would incur the $200 fee associated with a stormwater construction permit.

If a permit modification is needed as a result of the proposed rule, the facility would incur the cost associated with a permit modification:
- Major Municipal and Major Industrial Permit: Major Mod = $5,000; Minor Mod = $1,000
- Minor Municipal and Minor Industrial Permit: Major Mod = $2,000; Minor Mod = $1,000

Entities with stricter monitoring requirements for minerals may incur increased cost of monitoring chlorides (Cl), sulfates (SO_4), and total dissolved solids (TDS). Estimated average cost for analysis for these parameters by Little Rock area laboratories is $19.00 per sample for Cl and SO_4, and $21.00 per sample for TDS.

Failure to meet these limits may result in a formal enforcement action, including the assessment of civil penalties. Penalties associated with enforcement action can range from a base of $50 for a minor noncompliance event to a base of greater than $9,600 for a major noncompliance event.

In order to meet stricter permit limits for minerals, permittees may implement additional treatment. Reverse osmosis (RO) treatment is capable of removing CL, SO_4, and TDS.

A summary of recent RO estimates developed by facilities in Arkansas:
Municipality 1
Capital costs of installing a three stage RO treatment system handling an average of 1,500 gallons per minute (gpm) of water for a municipal wastewater facility have been estimated as follows:
Capital cost $6,500,000
Annual operating cost $4,400,000

Municipality 2
Capital costs of installing a membrane treatment system for a municipal facility with an average design capacity of 12.6 million gallons per day (mgd) has been estimated as follows:
Capital cost $188 million to $396 million

Industry 1
Capital costs of installing advanced treatment, including ultra-filtration, reverse osmosis, and concentration/crystallization for an industrial facility with a design flow of 1.25 mgd has been estimated as follows:
Capital cost $30.5 million
Annual operating cost $4.6 million

Industry 2
Capital costs of installing a RO treatment system handling an average of 150 gpm of water for an industrial facility have been estimated as follows:
Capital cost $650,000

Annual operating cost $441,000

Industry 3
Capital costs of installing a RO with deep well injection of the RO reject stream for an industrial facility has been estimated as follows:
Capital cost $44,000,000
Annual operating cost $5,800,000

Industry 4
Capital costs of installing a RO treatment system for an industrial facility has been estimated as follows:
Capital cost $8.4 million
Annual operating cost $2.7 million

Industry 5
Capital costs of installing a RO treatment system handling an average of 0.24 mgd of water for an industrial facility have been estimated as follows:
Capital cost $6,400,000
Annual operating cost $1,020,000

ADEQ analysis of RO treatment costs

The ADEQ analysis did not include additional pretreatment costs or costs of the disposal of the RO waste stream. It was presumed that the quality of the wastewater treated by a RO system would be of high enough quality to prevent over-fouling of the membranes, thus making additional pretreatment unnecessary. Additionally, disposal costs were not included due to the difficulty of calculating an "average" cost. Disposal would most likely be through underground injection wells. Examples of some of the costs of sending wastewater to an injection well will depend on: 1) whether the facility will need to further concentrate the waste stream prior to its acceptance at a well; 2) the distance of a POTW to an existing injection well (transportation costs); and 3) whether the facility will need to drill a new underground injection well.

The analysis was based on estimated per gallon capital and operating and maintenance (O&M) costs to add a RO treatment system to existing conventional drinking water plants with surface water sources. A major assumption in the analysis is that the number of banks of filters and pretreatment requirements should be the same for existing wastewater treatment plants and drinking water plants. The 4.2% interest rate for annualizing present value costs is based on historical 20-year municipal bond data from the Federal Reserve's website (average of 20-year municipal bond rates from December 2010 to November 2012).

See Table 7 on the next page for a summary of ADEQ's analysis.

Table 7. Analysis of Reverse Osmosis Treatment Costs

	up to 0.01 MGD	up to 0.1 MGD	up to 1 MGD	up to 10 MGD	up to 100 MGD	
Total Number of Facilities:	**1**	**105**	**152**	**51**	**8**	Totals
Capital Cost (1 time, present value) for all plants in size category:	$82,500.00	$11,630,850.00	$58,026,500.00	$168,695,000.00	$104,632,500.00	$343,067,350.00
O&M Cost (annual cost) for all plants in size category:	$50.00	$9,969.30	$52,223.85	$109,651.75	$76,730.50	$248,625.40

	up to 0.01 MGD	up to 0.1 MGD	up to 1 MGD	up to 10 MGD	up to 100 MGD	
Total Number of Facilities:	**1**	**105**	**152**	**51**	**8**	Total
Capital Cost (annualized over 20 years at 4.2%) for all plants in size category:	$6,178.49	$871,043.12	$4,345,648.29	$12,633,695.62	$7,836,006.74	$25,692,572.25
O&M Cost (annual cost) for all plants in size category:	$50.00	$9,969.30	$52,223.85	$109,651.75	$76,730.50	$248,625.40
Annualized Total:	$6,228.49	$881,012.42	$4,397,872.14	$12,743,347.37	$7,912,737.24	$25,941,197.65

	up to 0.01 MGD	up to 0.1 MGD	up to 1 MGD	up to 10 MGD	up to 100 MGD	
Total Number of Facilities:	**1**	**105**	**152**	**51**	**8**	Total
Capital Cost (1 time, present value) for all plants in size category:	$82,500.00	$11,630,850.00	$58,026,500.00	$168,695,000.00	$104,632,500.00	$343,067,350.00
O&M Cost (present value of 20 years at 4.2%) for all plants in size category:	$667.64	$133,117.90	$697,333.75	$1,464,156.06	$1,024,565.74	$3,319,841.09
Present Value:	$83,167.64	$11,763,967.90	$58,723,833.75	$170,159,156.06	$105,657,065.74	$346,387,191.09

2) *The following are potential costs of implementing this ruling:*
If a Use Attainability Analysis (UAA) is needed as a result of the proposed rule, the ADEQ Water Planning section would incur a base estimate cost of $5,743 for a base estimate of 336 man hours to process the UAA.

If a UAA is needed as a result of the proposed rule, the ADEQ Legal Division would incur a base estimate cost of $375 for a base estimate of fifteen (15) man hours to review the UAA and related third-party rulemaking documents.

If a Consent Administrative Order (CAO) is needed as a result of the proposed rule, ADEQ Water Enforcement section would incur a base cost of $287 for a base estimate of sixteen (16) man hours to process the CAO.

If a CAO is needed as a result of the proposed rule, the ADEQ Legal Division would incur a base cost of $250 for a base estimate of ten (10) man hours to process the CAO. If formal enforcement through a Notice of Violation (NOV) is necessary, the base estimated cost would be increased at least twofold.

If a permit modification is needed as a result of the proposed rule, the ADEQ Water Permits section would incur a base cost of $754 for a base estimate of forty (40) man hours to process the permit modification.

If a permit modification is needed as a result of the proposed rule, the ADEQ Legal Division would incur a base cost of $300 for a base estimate of twelve (12) man hours to review the permit modification. Any appeal of the permit modification would increase the base estimated costs by at least threefold.

If a TMDL is required for a waterbody as a result of that waterbody being assessed as impaired, ADEQ would incur the following estimated costs. Through consultant contract, ADEQ would incur a base estimated cost range of $35,900 to $84,800 per TMDL package, depending upon the complexity of the TMDL package. The ADEQ Water Planning section would incur a base cost of $5,470 for a base estimate of three hundred and twenty (320) man hours to process a TMDL package.

2.106 Definitions

1) *The revision of the definitions for aquatic life, bioaccumulation, conventional pollutants, criterion continuous concentration, criterion maximum concentration, groundwater, ground water under the direct influence of surface water, harmonic mean flow, headwater, maximum contaminant level, natural background, nonpoint source, and seasonal aquatic life will have no increased or decreased cost for the average facility to implement this proposed rule.*
2) *There is no extra cost to implement this proposed rule.*

2.302 Designated Uses

1) There will be no increased or decreased cost for the average facility to implement this proposed rule.

2) There is no extra cost to implement this proposed rule.

2.304 Physical Alteration of Habitat

1) There will be no increased or decreased cost for the average facility to implement this proposed rule.

2) There is no extra cost to implement this proposed rule.

2.401 Applicability

1) There will be no increased or decreased cost for the average facility to implement this proposed rule.

2) There is no extra cost to implement this proposed rule.

2.402 Nuisance Species

1) There will be no increased or decreased cost for the average facility to implement this proposed rule.

2) There is no extra cost to implement this proposed rule.

2.404 Mixing Zones

1) There may be an increase in costs for the average facility to implement this proposed rule if they currently are or are planning to consider a mixing zone under one of the following scenarios:

- ***a.*** *pH that does not fall within the exemptions for POTWs found in 40 C.F.R. § 133.102(c);*
- ***b.*** *discharge of a substance that is bioaccumulative, persistent, carcinogenic, mutagenic, or teratogenic;*
- ***c.*** *water supply intake or public water supply wells that have been determined by the State to be ground water under the direct influence of surface water connected to the mixing zone.*

2) These facilities may incur increased cost due to revisions to the facility or the outfall in order to meet the requirements of this proposed rule.

3) There is no extra cost to implement this proposed rule.

2.405 Biological Integrity

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule. The type of data necessary for an aquatic biota assessment is not changing, only the text describing how this data is to be interpreted.*

2) *There is no extra cost to implement this proposed rule.*

2.409 Toxic Substances

1) There will be no increased or decreased cost for the average facility to implement this proposed rule.

2) There is no extra cost to implement this proposed rule.

2.501 Applicability

1) There will be no increased or decreased cost for the average facility to implement this proposed rule.

2) There is no extra cost to implement this proposed rule.

2.502 Temperature

1) There will be no increased or decreased cost for the average facility to implement this proposed rule. The cost of collecting lake and reservoir temperature data will not change due to a depth of 1.0 meter being specified.

2) There is no extra cost to implement this proposed rule.

2.503 Turbidity

1) There will be no increased or decreased cost for the average facility to implement this proposed rule. The cost of collecting lake and reservoir turbidity data will not change due to a depth of 1.0 meter being specified.

2) There is no extra cost to implement this proposed rule.

2.504 pH

1) This proposed rule may affect those facilities whose permits currently consider a mixing zone for pH that do not fall under the exemptions for POTWs found in 40 C.F.R. § 133.102(c).

2) These facilities may incur increased cost due to revisions to the facility or the outfall in order to meet the requirements of this proposed rule.

2.505 Dissolved Oxygen

1) There will be no increased or decreased cost for the average facility to implement this proposed rule.

2) *There is no extra cost to implement this proposed rule.*

2.507 Bacteria

1) There will be no increased or decreased cost for the average facility to implement this proposed rule.

2) There is no extra cost to implement this proposed rule.

2.508 Toxic Substances

1) There will be no increased or decreased cost for the average facility to implement this proposed rule.

2) There is no extra cost to implement this proposed rule.

2.509 Nutrients

1) Entities discharging into Beaver Lake may have stricter permit limits or monitoring conditions. The costs associated with updating facilities in order to meet stricter limits can vary greatly due to the potential differences in facility design. These differences could include, but are not limited to: type of discharge; chemicals, processes, and mechanics used during production; characteristics of receiving waterbody; and age and size of facility.

If a stormwater construction permit is needed as a result of the proposed rule, the facility would incur the $200 fee associated with a stormwater construction permit.

If a permit modification is needed as a result of the proposed rule, the facility would incur the cost associated with a permit modification.
- Major Municipal and Major Industrial Permit: Major Mod = $5,000; Minor Mod = $1,000
- Minor Municipal and Minor Industrial Permit: Major Mod = $2,000; Minor Mod = $1,000

Entities with stricter monitoring requirements for nutrients may incur increased cost of monitoring Total Nitrogen (TN) and Total Phosphorus (TP). Estimated average cost for analysis for these parameters by Little Rock area laboratories is $72 per sample of TN and $26.00 per sample for TP.

Failure to meet these limits may result in a formal enforcement action including the assessment of civil penalties. Penalties associated with enforcement action can range from a base of $50 for a minor noncompliance event, to a base of greater than $9,600 for a major noncompliance event.

2) The following are potential costs of implementing this rule:
If a Consent Administrative Order (CAO) is needed as a result of the proposed rule, ADEQ Water Enforcement section would incur a base cost of $287 for a base estimate of sixteen (16) man hours to process the CAO.

If a CAO is needed as a result of the proposed rule, the ADEQ Legal Division would incur a base cost of $250 for a base estimate of ten (10) man hours to process the CAO. If formal enforcement through a Notice of Violation (NOV) is necessary, the base estimated cost would be increased at least twofold.

If a permit modification is needed as a result of the proposed rule, the ADEQ Water Permits section would incur a base cost of $754 for a base estimate of forty (40) man hours to process the permit modification.

If a permit modification is needed as a result of the proposed rule, the ADEQ Legal Division would incur a base cost of $300 for a base estimate of twelve (12) man hours to review the permit modification. Any appeal of the permit modification would increase the base estimated costs by at least threefold.

2.510 Oil and Grease

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*
2) *There is no extra cost to implement this proposed rule.*

2.511(A) Mineral Quality

1) *a., b., & c. There will be no increased or decreased cost for the average facility to implement this proposed rule.*

d. Entities discharging into Bayou Two Prairie, in or upstream of the ERW designated segment, may have stricter permit limits. Updating facilities in order to meet stricter limits can vary greatly due to the potential differences in facility design. These differences could include, but are not limited to: type of discharge; chemicals, processes, and mechanics used during production; characteristics of receiving waterbody; and age and size of facility. Failure to meet these limits may result in a formal enforcement action including the assessment of civil penalties.

2) *There is no extra cost to implement this proposed rule.*

2.511(B) Mineral Quality

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*
2) *There is no extra cost to implement this proposed rule.*

2.511(C) Mineral Quality

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*
2) *There is no extra cost to implement this proposed rule.*

2.512 Ammonia

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*
2) *There is no extra cost to implement this proposed rule.*

Appendix A

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*
2) *There is no extra cost to implement this proposed rule.*

Appendix C

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*
2) *There is no extra cost to implement this proposed rule.*

Appendix D

1) *There will be no increased or decreased cost for the average facility to implement this proposed rule.*
2) *There is no extra cost to implement this proposed rule.*

Sources and Assumptions (for all of the above):

Arkansas Department of Environmental Quality Uniform Penalty Policy, March 1, 2012.

Arkansas Pollution Control and Ecology Commission, Regulation No. 9, Fee Regulation, June 22, 2012.

Federal Reserve System. Selected Interest Rates, Historical Data, State and Local Bonds. Accessed 12/17/2012. www.federalreserve.gov/releases/h15/data.htm.

Loutre Creek – Section 2.303 Use Attainability Analysis, August 31, 2012.

Poteau River – Section 2.306 Site Specific Water Quality Study Tyson Foods, Inc. July 2, 2012.

Total Maximum Daily Load Development for Water Bodies Listed on the 2008 List of Impaired Water Bode4is (303d List), Prepared by FTN & Associates, December 2, 2009.

Use Attainability Analysis Report, Bayou DeView and Big Creek, Craighead County, AR, August 26, 2009.

Use Attainability Analysis Report for Boggy Creek, Union County, Arkansas, January 2007

Use Attainability Analysis Report for Brushy Creek, Vulcan Construction Materials, LP Black Rock Quarry Lawrence County, Arkansas, September 12, 2011.

Use Attainability Analysis for Wilson Creek, Garland County, Arkansas, June 2005.

Water Research Foundation/EPA Project 3115. Simultaneous Compliance Tool. 2009. www.simultaneouscompliancetool.org

White River Use Attainability Analysis – Fayetteville, Arkansas (Draft) August 27, 2012.

Assumptions
Cost estimates for ADEQ personnel are based on the entry level base pay for an Enforcement Analyst ($17.933/hour), Engineer ($18.8457/hour), and Ecologist ($17.0933/hour) or $25/hour for an Attorney (average salary estimate).

3. List any fee changes imposed by this proposal and justification for each.

There are no fee changes associated with this proposed rule.

4. What is the probable cost to ADEQ in manpower and associated resources to implement and enforce this proposed change, and what is the source of revenue supporting this proposed rule?

Pursuant to the Clean Water Act ("CWA"), Arkansas has been delegated the authority to establish and administer water quality standards. The CWA requires states to review their water quality standards on a triennial basis and to amend those standards as necessary. The manpower and associated resources required to implement this proposed rule is funded through the Environmental Protection Agency through the delegated CWA program.

The following are potential costs of implementing this rule:
If a Use Attainability Analysis ("UAA") is needed as a result of a proposed rule, the ADEQ Water Planning section would incur a base cost of approximately $5,743 for an estimated 336 man hours to process the UAA.

If a UAA is needed as a result of the proposed rule, the ADEQ Legal Division would incur a base estimate cost of $375 for a base estimate of fifteen (15) man hours to review the UAA and related third-party rulemaking documents.

If a Consent Administrative Order (CAO) is needed as a result of a proposed rule, ADEQ Water Enforcement section would incur a base cost of approximately $287 for an estimated sixteen (16) man hours to process the CAO.

If a CAO is needed as a result of the proposed rule, the ADEQ Legal Division would incur a base cost of $250 for a base estimate of ten (10) man hours to process the CAO. If formal enforcement through a Notice of Violation (NOV) is necessary, the base estimated cost would be increased at least twofold.

If a permit modification is needed as a result of the proposed rule, the ADEQ Water Permits section would incur a base cost of $754 for a base estimate of forty (40) man hours to process the permit modification.

If a permit modification is needed as a result of the proposed rule, the ADEQ Legal Division would incur a base cost of $300 for a base estimate of twelve (12) man hours to review the permit modification. Any appeal of the permit modification would increase the base estimated costs by at least threefold.

Sources and Assumptions:
Ark. Code Ann. §8-4-206 and 8-4-207 (authority and responsibilities as state water pollution control agency).

Assumptions
Cost estimates for ADEQ personnel are based on the entry level base pay for an Enforcement Analyst ($17.933/hour), Engineer ($18.8457/hour), and Ecologist ($17.0933/hour) or $25/hour for an Attorney (average salary estimate).

5. Is there a known beneficial or adverse impact to any other relevant state agency to implement or enforce this proposed rule? Is there any other relevant state agency's rule that could adequately address this issue, or is this proposed rulemaking in conflict with or have any nexus to any other relevant state agency's rule? Identify state agency and/or rule.

There are no known adverse impacts to any other relevant state agency. Other state agencies that are charged with protecting the state's natural resources or water quality, such as Arkansas Game and Fish Commission and the Arkansas Department of Health, will benefit from the proposed rule, as it will support their mission. This proposed rule cannot be adequately addressed by another state agency's rule, as the authority to adopt water quality standards was vested in the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann.

§ 8-4-202(b)(3). This proposed rulemaking is not in conflict with, nor has any nexus to another state agency's rule.

Sources and Assumptions:
Ark. Code Ann. § 8-4-202(b)(3) (authority of Commission to adopt water quality standards).

6. Are there any less costly, non-regulatory, or less intrusive methods that would achieve the same purpose of this proposed rule?

There are no less costly, non-regulatory, or less intrusive methods that would achieve the same purpose of the proposed rule. As stated above, the Clean Water Act requires the State to review and update water quality standards every three years. The related federal regulations outline a specific procedure for this process. Alternative methods are not available to comply with the federal requirements.

Sources and Assumptions:
40 C.F.R. § 131.1 et seq.

2B. ENVIRONMENTAL BENEFIT

1. What issues affecting the environment are addressed by this proposal?

These proposed rules address water quality for all waters of the State. These proposals provide for the continued protection of ecological, recreational, and water supply benefits.

2.104 Policy for Compliance
Compliance with water quality limits.

2.106 Definitions
Critical flow definition
The use of an accurate stream flow or harmonic mean flow in calculating permit limitations results in appropriate pollutant concentrations in permits and will protect designated uses. If an inaccurate flow was used, the permit limitation would be inappropriate for actual conditions and could result in the stream being added to the List of Impaired Waterbodies.

2.106 Definitions
Definitions aid in the understanding of the standards that protect Arkansas's water quality.

2.302 Designated Uses
"Aquatic Life" more accurately labels the designated use that "provides for the protection and propagation of fish, shellfish, and other forms of aquatic biota."

2.304 Physical Alteration of Habitat
Continued protection from physical alteration of habitat in waterbodies designated as Extraordinary Resource Waters ("ERW"), Ecologically Sensitive Waterbodies ("ESW"), or Natural and Scenic Waterways ("NSW").

2.401 Applicability
The additional text will help avoid confusion with the application of the general standards and those waterbodies with site specific standards.

2.402 Nuisance Species
Renaming aquatic "life" as aquatic "biota" would help avoid confusion with the Designated Use – Aquatic life.

2.404 Mixing Zones
Mixing zone considerations related to pH; bioaccumulative, persistent, carcinogenic, mutagenic, and teratogenic substances; and water intakes or supply wells determined to be ground water under the direct influence of surface water connected to a mixing zone.

2.405 Biological Integrity
The revision will clarify the collection of biological data for aquatic biota assessments and the interpretation of the data collected.

2.409 Toxic Substances
Renaming aquatic "life" as aquatic "biota" would help avoid confusion with the Designated Use – Aquatic life.

2.501 Applicability
The additional text will help avoid confusion with the application of the specific standards and those waterbodies with site specific standards.

2.502 Temperature
Standardization of lake sampling depth.

2.503 Turbidity
The collection and assessment of turbidity data and standardization of lake sampling depth.

2.504 pH
Clarify lake depths at which standards are applicable and prohibit mixing zones for pH.

2.505 Dissolved Oxygen
Avoiding confusion with the Designated Use – Aquatic life; and standardization of lake sampling depth.

2.507 Bacteria
Appropriate interpretation of bacteria criteria.

2.508 Toxic Substances
Continued protection of waters receiving toxic substances.

2.509 Nutrients
Protection of Beaver Lake as a drinking water source.

2.510 Oil and Grease
Continued protection of waters receiving oil and grease.

2.511(A) Mineral Quality
1., 2., 3. Accurate assessment of site specific minerals criteria for continued protection of waters from excess CL, SO4, and TDS..
4. Protection of water quality in the segment of Bayou Two Prairie designated as an ERW.

2.511(B) Mineral Quality
Appropriate interpretation of ecoregion reference stream values.

2.511(C) Mineral Quality
Continued protection of waters from excess CL, SO4, and TDS.

Reg. 2.512 Ammonia
Continued protection of waters receiving ammonia.

Appendix A
Use of updated GIS data and inclusive listings of those Threatened and Endangered aquatic species whose habitat is currently protected under the ESW designated use.

Appendix C
Continued protection of those Threatened and Endangered aquatic species whose habitat is currently protected under the ESW designated by providing a listing of the scientific names.

Appendix D
Continued protection of waterbodies designated as ERW, ESW, and NSW by providing an easily accessible "all in one place" list.

2. How does this proposed rule protect, enhance, or restore the natural environment for the well being of all Arkansans?

These proposed rules will protect, enhance, or restore the natural environment for the well being of all Arkansans by maintaining and protecting the water quality and biological integrity of all waters of the State.

2.104 Policy for Compliance
Allows the Department to use discretion concerning compliance schedule for effluent limits

2.106 Definitions
Critical flow definition
Provides continued protection for waterbodies which receive discharges whose effluent contains Cl, SO4, and TDS.

2.106 Definitions

The revisions to the definitions in this regulation allow for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.302 Designated Uses

The revision of this regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.304 Physical Alteration of Habitat

Allows for continued protection of aquatic habitats within waterbodies designated as ERW, ESW, and NSW.

2.401 Applicability

The revision of this regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.402 Nuisance Species

The revision of this regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.404 Mixing Zones

The revision of this regulation allows for protection of waters in which a facility is currently, or is planning to consider a mixing zone under one of the following scenarios:

- ***a.*** *pH that does not fall within the exemptions for POTWs found in 40 C.F.R. § 133.102(c);*
- ***b.*** *discharge of a substance that is bioaccumulative, persistent, carcinogenic, mutagenic, or teratogenic;*
- ***c.*** *water supply intake or public water supply wells that have been determined by the State to be ground water under the direct influence of surface water connected to the mixing zone.*

2.405 Biological Integrity

Allows for the collection of biological data from entities outside of ADEQ. Allowing outside entities to collect additional biological data will enhance ADEQ's decision making and management concerning the state's aquatic biological resources.

2.409 Toxic Substances

The revisions to the definitions in this regulation allow for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.501 Applicability

The revision of this regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.502 Temperature

The revisions to the definitions in this regulation allow for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.503 Turbidity

Removal of the word "ambient" allows for more turbidity data to be taken into consideration for impaired waterbodies assessments. Additional turbidity data will enhance ADEQ's decision making and management practices of the state's waterbodies.

2.504 pH

Clarifies depth at which to measure lake pH and prohibits a mixing zone for pH, except as exempted under 40 C.F.R. § 133.201(c).

2.505 Dissolved Oxygen

The reformatting of this regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.507 Bacteria

The reformatting of this regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.508 Toxic Substances

Allows for continued protection of waterbodies from toxic substances. This revision clarifies the intent of the regulation and allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.509 Nutrients

Establishes water quality standards for the protection of Northwest Arkansas's major drinking water source; Beaver Lake provides drinking water to over40,000 Arkansans.

2.510 Oil and Grease

Allows for continued protection of waterbodies from oil and grease. This revision clarifies the intent of the regulation and allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.511(A) Mineral Quality

1., 2., 3. The revision of this regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.
4. Allows for continued protection of the ERW designated portion of Bayou Two Prairie that runs thru the Smoke Hole Natural Area. The Arkansas Natural Heritage Commission is responsible for designating Natural Areas in the state.

2.511(B) Mineral Quality

The revision of this regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

2.511(C) Mineral Quality
The revision of this regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding.

Appendix A
The revision of this Regulation allows for easier comprehension, thereby providing better protection by eliminating misunderstanding. Inclusive listings of those Threatened and Endangered aquatic species whose habitat is protected under the ESW designated use allows for a more inclusive review by ADEQ and other agencies.

Appendix C
The revision of this Regulation allows for a fuller understanding of those Threatened and Endangered aquatic species whose habitat is protected under the ESW designated use by providing a listing of the scientific names.

Appendix D
The revision of this Regulation allows better protection by eliminating misunderstanding concerning which waterbodies are designated as an ERW, ESW, or NSW.

Sources and Assumptions:
Beaver Lake Site-Specific Water Quality Criteria Development: Recommended Criteria, prepared by FTN-Associates, Ltd., February 8, 2008
http://www.bwdh2o.org/

3. What detrimental effect will there be to the environment or to the public health and safety if this proposed rule is not implemented?

The proposed changes are necessary to ensure that existing uses and designated uses for waters of the State, and the water quality necessary to protect those uses, are protected and maintained.

2.104 Policy for Compliance
No detrimental environmental or public health and safety effects would be noted.

2.106 Definitions
Critical flow definition
Potential degradation of water quality in waters which receive discharges whose effluent contains Cl, SO4, and TDS, due to use of an inaccurate stream flow.

2.106 Definitions
No detrimental environmental or public health and safety effects would be noted.

2.302 Definitions
Misunderstanding in the interpretation of the designated use could lead to inadequate protection for the "shellfish and other forms of aquatic biota" protected by the designated use.

2.304 Physical Alteration of Habitat

The current language has not been approved by EPA for use as water quality standard; therefore, if the language remains in the regulation, it could be confusing to the public and regulated entities that rely on the regulation. After extensive discussion with stakeholder, ADEQ proposes a return to earlier language that has been previously approved by the Commission and EPA.

2.401 Applicability
Misunderstanding in the application of the general standards (Chapter 4) applicable to most waters could lead to inadequate protection of those waters with site specific standards.

2.402 Nuisance Species
No detrimental environmental or public health and safety effects would be noted.

2.404 Mixing Zones
Inappropriate application of mixing zone procedures could result in the degradation of water quality.

2.405 Biological Integrity
Requiring ADEQ to perform all biological studies would result in a large decrease in the biological data available for evaluation due to limitations in personnel and resources. Fewer biological studies could result in missed opportunities to evaluate degradation of water quality.

2.409 Toxic Substances
No detrimental environmental or public health and safety effects would be noted.

2.501 Applicability
Misunderstanding in the application of the specific standards (Chapter 5) applicable to most waters could lead to inadequate protection of those waters with site specific standards.

2.502 Temperature
Inconsistencies in the collection of lake samples could lead to misunderstandings in the interpretation of lake temperature data and could lead to inappropriate permitting practices and unprotected waterbodies, resulting in more waterbodies being impaired or failing to meet their designated uses.

2.503 Turbidity
Fewer turbidity data points could result in missed opportunities to assess degradation of water quality due to turbidity. Unassessed increases in turbidity could result in degradation of aquatic habitat. Inconsistencies in the collection of lake samples could lead to misunderstandings in the interpretation of lake turbidity data and could lead to inappropriate permitting practices and unprotected waterbodies, resulting in more waterbodies being impaired or failing to meet their designated uses.

2.504 pH
No detrimental environmental or public health and safety effects would be noted.

2.505 Dissolved Oxygen

Misunderstanding in the interpretation of the dissolved oxygen regulation could lead to inappropriate permitting practices and unprotected waterbodies. Inconsistencies in the collection of lake samples could lead to misunderstandings in the interpretation of lake dissolved oxygen data and could lead to inappropriate permitting practices and undprotected waterbodies, resulting in more waterbodies being impaired or failing to meet their designated uses.

2.507 Bacteria

Misunderstanding in the interpretation of the bacteria regulation could lead to inappropriate permitting practices and unprotected waterbodies. Inconsistencies in the collection of lake samples could lead to misunderstandings in the interpretation of lake bacteria data and could lead to inappropriate permitting practices and unprotected waterbodies, resulting in more waterbodies being impaired or failing to meet their designated uses.

2.508 Toxic Substances

Misunderstanding in the interpretation of the toxic substances regulation could lead to inappropriate permitting practices and unprotected waterbodies, resulting in more waterbodies being impaired or failing to meet their designated uses.

2.509 Nutrients

Without this proposed rule, there is a potential for increases in nuisance algae species leading to an increase in taste and odor issues in a major drinking water source. Beaver Lake is already experiencing high turbidity/sediment inflows and taste and odor problems due to blue-green algae. Past and present water quality problems indicate that the current water quality criteria are not adequate to protect Beaver Lake from being impacted by nutrients or sediment/turbidity. For example, the current turbidity standard for all reservoirs in Arkansas is 25 NTUs. This value has a water clarity depth of less than two feet. For a deep clear water lake, used for recreation and as a public water supply, a water clarity depth of less than 24 inches is not suitable. With current water quality criteria, Beaver Lake could be severely impacted before it would be listed on the impaired waterbody list. Continuation of these issues could lead to impairment of designated uses, such as drinking water or recreational uses.

2.511(A) Mineral Quality

1., 2., 3. Misunderstanding in the interpretation of the minerals regulation could lead to inappropriate permitting practices and unprotected waterbodies, resulting in more waterbodies being impaired or failing to meet their designated uses.
4. Potential degradation of water quality in the portion of Bayou Two Prairie designated as an Extraordinary Resource Water.

2.511(B) Mineral Quality

Misunderstanding in the interpretation of the minerals regulation could lead to inappropriate permitting practices and unprotected waterbodies, resulting in more waterbodies being impaired or failing to meet their designated uses.

2.511(C) Mineral Quality

Misunderstanding in the interpretation of the minerals regulation could lead to inappropriate permitting practices and unprotected waterbodies, resulting in more waterbodies being impaired or failing to meet their designated uses.

Appendix A

Misinterpretation of the representations in the old map format could lead to lessened protection of waterbodies designated as ERW, ESW, NSW, or trout waters. Misinterpretation of the extent of waters in which site specific standards variations or site specific designated use variations have occurred could lead to inappropriate assessment of these water's leading inappropriate management decisions.

Appendix C

No detrimental environmental or public health and safety effects would be noted.

Appendix D

No detrimental environmental or public health and safety effects would be noted.

Sources and Assumptions:

State of Arkansas Nutrient Criteria Development Plan, 2008

4. What risks are addressed by the proposal and to what extent are the risks anticipated to be reduced?

Risks for potential degradation of water quality and aquatic habitat, as discussed in the section on positive economic impacts.

Sources and assumptions:

See above.