UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
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DALLAS, TEXAS 75270

June 2, 2020

Bob Blanz, Associate Director
Office of Water Quality
Division of Environmental Quality
Arkansas Department of Energy and Environment
5301 Northshore Drive
Little Rock, AR 72118-5317

Re: Amendments to *Regulation No. 2: Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas* by third-party rulemaking initiated by the Tyson Foods, Inc., - Waldron Plant, Waldron, AR

Dear Dr. Blanz:

The Environmental Protection Agency (EPA) has completed its review of the amendments to *Regulation No. 2: Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas* that were made in relation to the Third-Party Rulemaking process initiated by Tyson Foods, Inc. The amendments to Regulation No. 2 were adopted by the Arkansas Pollution Control and Ecology Commission (Commission) on July 26, 2019 and became effective as state law on August 6, 2019. These amendments were submitted to the EPA for approval on August 20, 2019 by the Arkansas Department of Environmental Quality (ADEQ).

At this time, EPA is approving the revised site-specific criteria in Regulation 2.511 and Appendix A of Regulation No. 2, including the site-specific criteria changes for chloride, sulfate and total dissolved solids (TDS) in the Poteau River from the confluence of the unnamed tributary to Scott Count Road 59 and the unnamed tributary from Tyson-Waldron Outfall 001 to its confluence with the Poteau River. The EPA anticipates that ADEQ will develop Tier 2 antidegradation review as required by 40 CFR 131.12(a)(2)(i) to evaluate the use of assimilative capacity in allowing discharges of chloride, sulfate and TDS during the NPDES permitting process. The full requirements of a Tier 2 review can be found at 40 CFR 131.12(a)(2).

The approval of new and revised water quality standards is subject to the results of consultation under section 7(a)(2) of the Endangered Species Act (ESA). Section 7(a)(2) of the ESA requires that federal agencies consult with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), as appropriate, to ensure that actions they take, fund, or authorize are not likely to jeopardize the continued existence of listed species or result in the adverse modification or destruction of habitat. No species under NMFS jurisdiction are present in the action area. The EPA has concluded consultation with USFWS and has received concurrence with EPA's determination that the revised criteria are not likely to adversely affect threatened and endangered species or critical habitat by letter dated May 18, 2020.

I appreciate the Commission's and ADEQ's efforts in the review of these revised provisions of the state's standards. If you have any questions or concerns, please contact me at (214) 665-8138, or contact Russell Nelson at (214) 665-6646 or nelson.russell@epa.gov.

Sincerely,

Charles Maguire

Charles W. Maguire
Director
Water Division

cc: Joe Martin, Planning Branch Manager, Office of Water Quality, ADEQ
Mary Barnett, Ecologist Coordinator, Office of Water Quality, ADEQ

TECHNICAL SUPPORT DOCUMENT:

EPA REVIEW OF SITE-SPECIFIC CRITERION REVISION TO *REGULATION 2: REGULATION ESTABLISHING WATER QUALITY STANDARDS FOR SURFACE WATERS OF THE STATE OF ARKANSAS*

Revision Adopted by the
Arkansas Pollution Control and Ecology Commission
Modifying Water Quality Standards for Chlorides, Sulfates and Total Dissolved Solids for the Poteau River and an Unnamed Tributary to Poteau River in Waldron, Arkansas

U.S. EPA REGION 6
WATER DIVISION

June 1, 2020

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I. Introduction

Regulatory Requirements and Purpose

As described in § 303(c) of the Clean Water Act (CWA) and in the standards regulation within the Code of Federal Regulations (CFR) at 40 CFR § 131.20, states and authorized tribes have primary responsibility for developing and adopting water quality standards to protect their waters. State and tribal water quality standards consist of three primary components: designated uses, criteria to support those uses, and an antidegradation policy. In addition, CWA § 303(c)(1) and 40 CFR § 131.20 require states to hold public hearings at least once every three years to review and, as appropriate, modify and adopt standards. As required by 40 CFR § 131.21, the Environmental Protection Agency (EPA) reviews new and revised surface water quality standards that have been adopted by states and authorized tribes. Authority to approve or disapprove new and/or revised standards submitted to EPA for review has been delegated to the Water Division Director in Region 6. Tribal or state water quality standards are not effective under the CWA until approved by EPA.

The purpose of this Technical Support Document (TSD) is to describe EPA's analysis of the site-specific revisions to *Regulation Establishing Water Quality Standards for Surface Waters of the State of Arkansas* adopted by the Arkansas Pollution Control and Ecology Commission (Commission) and documents supporting these revisions.

Summary of Revised Provisions

By letter dated August 20, 2019 the Arkansas Division of Environmental Quality (ADEQ) submitted water quality standards revisions adopted by the Commission via Minute Order No. 19-11 to EPA for review and approval. These amendments were developed subject to Regulation No. 2.306, which allows for the modifications of water quality criteria. These amendments are based on a 3rd-party rulemaking proposed by Tyson Foods, Inc. to modify site-specific chloride, sulfate and total dissolved solids (TDS) water quality criteria as described in Table 1 below for the Poteau River and an unnamed tributary to the Poteau River in Waldron, Arkansas.

Table 1. Revised Criteria

	Previous Criteria			Revised Criteria		
Stream Reach	**Chloride (mg/L)**	**Sulfate (mg/L)**	**TDS (mg/L)**	**Chloride (mg/L)**	**Sulfate (mg/L)**	**TDS (mg/L)**
Unnamed Tributary at Waldron	150	70	660	180	200	870
Poteau River (downstream of the Unnamed Tributary)	120	60	500	185	200	786

EPA Action on the Revised Provisions

Based on the available information described in the following analysis, EPA has concluded that the revised site-specific criteria for the Poteau River and its unnamed tributary in

Waldron, Arkansas are not expected to significantly impact aquatic communities. Based on the weight of evidence, the revised site-specific criteria detailed below are approved pursuant to Sec. 303(c) of the CWA. Once approved by the EPA these criteria are in effect for all CWA purposes.

II. Background

Timeline

On May 9, 2013, the Tyson Foods, Inc.- Waldron Plant (Tyson-Waldron) submitted a petition requesting 3rd party rulemaking to amend Regulation 2 (now Rule 2) modifying site-specific chloride, sulfate and total dissolved solids (TDS) criteria specific to the unnamed tributary from Tyson-Waldron Outfall 001 to the confluence with the Poteau River and the Poteau River from its confluence with the unnamed tributary in Waldron, Arkansas to the Oklahoma state line. On May 20, 2013, Tyson-Waldron filed an amended petition, which was granted by Arkansas Pollution Control & Ecology Commission (APC&EC). Based on concerns expressed in comments by Arkansas Department of Environmental Quality and EPA on this amended petition, Tyson Waldron commissioned an additional year of water quality and biological data collection for the Poteau River. On January 11, 2019, Tyson-Waldron submitted a second amendment to its petition initiating 3rd party rulemaking to amend Regulation 2 based on a newly revised report entitled "Poteau River Section 2.306 Site Specific Water Quality Study" (Poteau River Study), which was based on the additional sampling conducted in the Poteau River in 2015 (GBM^c & Associates, 2018). This second amended petition diverged from the previous 2013 proposal, including new revisions to criteria for chlorides, sulfates and TDS, and termination of the applicable Poteau River segment at Scott County Road 59 near Bates, Arkansas (i.e. removed that portion of the river extending westward from Scott County Road 59 to the Oklahoma state line). The revised site-specific criteria were adopted by APC&EC on July 26, 2019 (APC&EC, 2020).

Watershed and Stream Descriptions and Conditions

The supporting Poteau River Study carried out by GBM^C & Associates indicates that the Poteau River watershed lies within Segment 3I of the Arkansas River Basin, USGS HUC 11110105-031, in Scott County Arkansas. The Poteau River flows westward from Waldron, Arkansas into Oklahoma, where it eventually turns north and east until its confluence with the Arkansas River in Fort Smith, Arkansas. This portion of the Poteau River is in the Arkansas Valley ecoregion. The Arkansas Valley Ecoregion is characterized as diverse and transitional, containing plains, hills, floodplains, terraces, and scattered mountains. Prior to the 19th century, uplands were dominated by a mix of forest, woodland, savanna, and prairie whereas floodplains and lower terraces were covered by bottomland deciduous forest. Today, less rugged upland areas have been cleared for pastureland or hayland. Poultry and livestock farming are important land uses (Woods et al., 2004).

APC&EC Rule 2 specifies primary contact recreation, industrial and agricultural water supply, and perennial Arkansas River Valley aquatic life uses to the Poteau River in Arkansas, and secondary contact recreation, industrial and agricultural water supply, and seasonal Arkansas River Valley aquatic life uses to the unnamed tributary to the Poteau River in Waldron,

Arkansas. The Poteau River near Waldron was listed on the state's 2016 303(d) list of impaired waters due to elevated levels of turbidity, chlorides, sulfates, TDS, and total phosphorus (ADEQ 2016). The source of impairment is cited as both municipal and industrial point sources. The unnamed tributary was also listed on the 2016 303(d) list for elevated chlorides and TDS.

Tyson-Waldron is classified as a poultry slaughtering and processing industry and is currently authorized to discharge treated process wastewater and boiler blowdown through NPDES Outfall 001 (NPDES No. AR0038482 - expired September 30, 2015) to an unnamed tributary of the Poteau River. The facility design flow is 1.25 mgd. Permit requirements contain discharge limitations for chloride, sulfate and TDS, which are the criteria concentrations applied as monthly averages, and 1.5 times criteria concentrations are applied as daily maximums. Whole effluent toxicity (WET) test results are to be reported quarterly. Tyson-Waldron and the city of Waldron Wastewater Treatment Plant (WWTP) (NPDES No. AR0035769; expiration date: November 30, 2020; facility design flow = 0.85 mgd) both discharge to the unnamed tributary and are the only two currently active NPDES permitted facilities within the HUC 11110105-031 reach.

III. Water Quality, Habitat and Biological Data Supporting the Revised Site-Specific Criteria

The focus of the Poteau River Study was an analysis of the discharge from the Tyson-Waldron facility outfall (Outfall 001), the unnamed tributary of the Poteau River that receives discharges from this outfall, and the Poteau River above and below the tributary confluence. This study was broken up into two parts based on data collections and analyses conducted in two separate time periods. Part 1 consisted of chloride, sulfate and TDS and discharge analyses based on data collections from Outfall 001 between March 2011 and February 2012, Gas Research Institute-Salinity Toxicity Relationship (GRI-STR) modeling based on Outfall 001 data, a review of approximately 5 years of quarterly WET tests (from January 2006 – October 2011) obtained for the Tyson Waldron Facility, and a 2011-2012 field study at four sites (one site on the unnamed tributary and 3 sites on the Poteau River) which included habitat characterization, ambient water quality analysis, spring and fall macroinvertebrate collections, and a fall fish collection. Part 1 also included an analysis of point and non-point sources and historic plant performance affecting stream and river conditions in 2011-2012. Part 2 of the Poteau River Study consisted of follow-up ambient water quality, habitat, flow and macroinvertebrate data analyses based on additional data collections at 6 Poteau River stations and a separate downstream Poteau River tributary reference stream in 2015. No additional outfall data analyses or fish collections were included in the 2015 study, nor was the unnamed tributary in Waldron re-evaluated.

The stated objectives of the Poteau River Study were to support site-specific water quality criteria for chloride, sulfate and TDS that reflect historic discharge concentrations of the Tyson-Waldron facility. These criteria are intended to protect the designated fishery uses in the Poteau River and the unnamed tributary of the Poteau River downstream of the Tyson-Waldron discharge. This study included lines of evidence to support the revised criteria. Each of these lines of evidence is described and evaluated in turn below.

Evaluation of WET Results

The Poteau River Study considered the results of whole effluent toxicity (WET) tests for Tyson-Waldron Outfall 001 conducted from January 2006 – October 2011. The test organisms were limited to *Ceriodaphnia dubia* and *Pimephales promelas* consistent with current NPDES permit testing requirements. In a review of 27 tests conducted over this time period, with the exception of test failures for survival and reproduction/growth endpoints for *C. dubia* and *P. promelas* on a single date, the respective NOELs and NOECs for each indicator test was 100%. The lone testing date on which failures were noted was traced to a co-occuring plant upset, which was identified and corrected, followed by additional confirmatory WET tests. Specific conductivity data collected at the same time as these successful WET tests correspond closely to (or in some cases exceed) monthly specific conductivity data collected at Outfall 001 in 2011-2012, at which time chlorides, sulfates and TDS data were also collected. *Average* concentrations of each of these constituents being discharged from Outfall 001 (see Table 4.3 of the Poteau River Study) at that time were greater than the revised criteria concentrations in the unnamed tributary, *which are based on a 95th percentile*. The study suggests that WET test results reflect worst-case conditions (100% effluent) at the outfall, therefore no minerals-based toxicity would be expected at revised criteria concentrations downstream.

Evaluation of GRI-STR Model Results

The Poteau River Study also describes the results of a GRI-STR model that was used to predict acute toxicity using the maximum for specific ions including chloride (Cl^-), sulfate (SO_4^{2-}), calcium (Ca^{2+}), magnesium (Mg^{2+}), potassium (K^+) and sodium (Na^+) as well as TDS and alkalinity as collected from Tyson-Waldron Outfall 001 in 2011-2012. The maximum value measured for each constituent was used in the GRI-STR model and was described as representative of the worst-case combination in the effluent, assuming organisms were exposed to 100% effluent using *Daphnia spp.*, *C. dubia* and *P. promelas* test organisms. The survival rate for each organism was reported as greater than 89% after 48-hours of exposure to 100% effluent (**Table 2**). This survival rate was approximate to the percent minimum significant difference (%MSD) of 90% for sublethal endpoints from *Daphnia* and *C. dubia* for WET tests reported under NPDES permit requirements.

Table 2. Summary of results from GRI-STIR Model

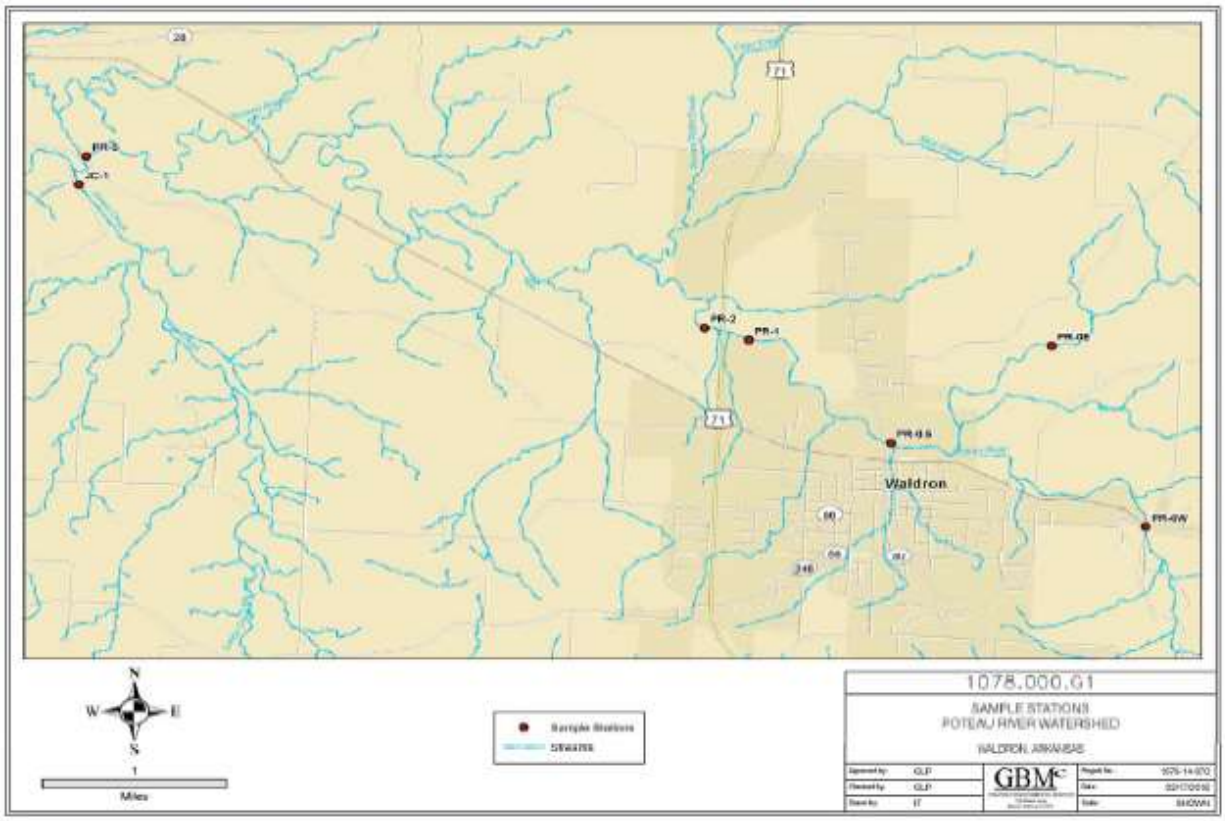
Organism	**Percent Survival at 48-h**
Ceriodaphnia dubia	89.5
Daphnia (*pulex* or *magna* not defined)	89.3
Pimephales promelas	96.3

The GRI-STR model results indicate a high survival rate for *Daphnia, C. dubia and P. promelas*, but this represents effects on test species based on the expected concentrations of individual ions measured over a one-year period, Although there appears to be some weight put on the outcome of this model, it is of limited value because it does not provide any information on the potential acute or chronic effects that complex ionic *mixtures* may have on biological assemblages once the revised site-specific criteria are implemented.

Water Quality Characterization

Water quality samples were collected monthly at 3 sites in 2011-2012 (Mar 2011-Feb 2012). Site UT-2 was located on the unnamed tributary below the Tyson-Waldron outfall. Site PR-1 was located in the Poteau River just upstream from the unnamed tributary confluence and was designated a reference site. Site PR-2 was located just downstream of US Highway 71 and the unnamed tributary confluence. Additional water quality samples were collected monthly by GBM[c] from sites PR-1 and PR-2, as well as at 5 other sites (3 sites upstream from site PR-1 and 2 sites downstream of site PR-2) in 2015 (Jan-Dec). Site UT-2 was not resampled in 2015. Site PR-2 was likewise sampled by Tyson Foods, Inc. multiple times per month in 2015. ADEQ also maintains a monthly monitoring station (ARK0055), located just upstream from site PR-2 but below the tributary confluence, from which dissolved minerals data were available between January 2011 and March 2016. See Figure 1 for all monitoring sites below.

Figure 1. Poteau River monitoring sites*



*Site UT-2 is not identified on this map; it is located on the tributary on the east side of US Highway 71 just upstream of its confluence with the Poteau River in northwest Waldron; site ARK0055 is also not identified on this map; it is located at the US Hwy 71 bridge just upstream from site PR-2.

The revised instream criteria as listed Table 1 above were calculated using the 95th percentile of those 12 monthly DO data points collected in the unnamed tributary (site UT-2) between March 2011 and February 2012, and the 95th percentile of all data collected by GBM[c],

Tyson Foods, Inc, and ADEQ at site PR-2 of the Poteau River between January 2011 and March 2016.

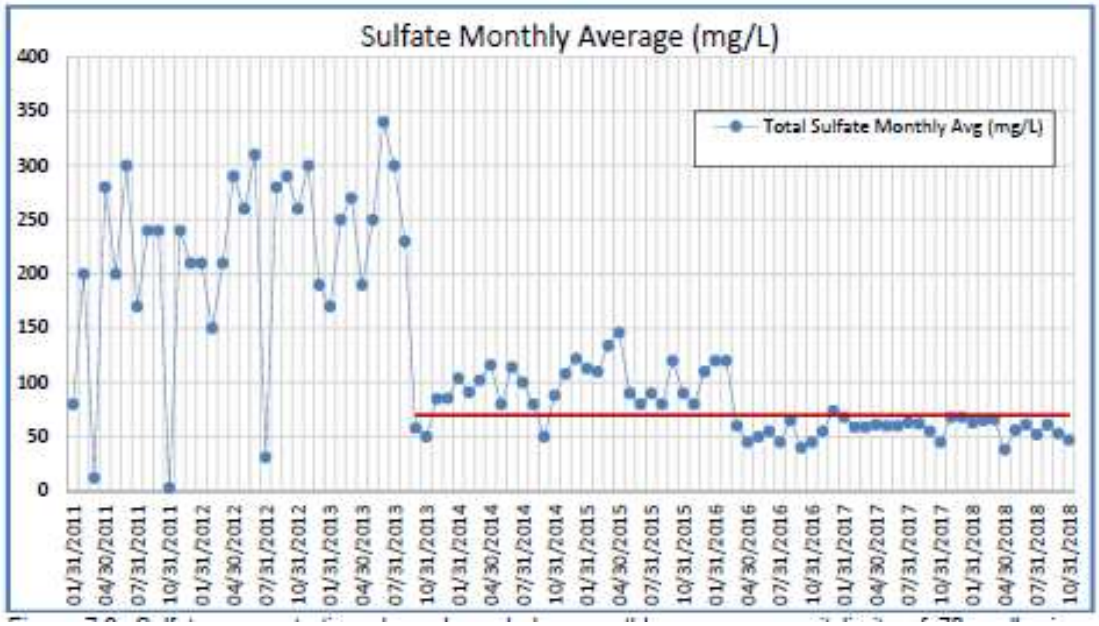
Sites UT-2 and PR-2 were sampled on the same dates in 2011-2012 as was the nearby Tyson-Waldron Outfall 001. Average annual concentrations for chlorides, sulfates and TDS from sites UT-2 and PR-2 were predictably less than those from Outfall 001 (e.g. average annual TDS concentrations were 461mg/L, 627mg/L and 885mg/L at PR-2, UT-2 and Outfall 001, respectively). This was likely due to dilution of Tyson-Waldron's discharge waters with those from the city of Waldron's WWTP.

Dissolved minerals concentrations at site PR-2 generally trended downward between 2011 and 2015, and further downward in 2016 and beyond. These trends appear to be consistent with plant optimization practices started in 2013, and further plant refinements in early 2016. No such trend observations could be made for site UT-2 as no additional data were available post-2012, although 95th percentiles of 2011-12 UT-2 data have been provided in Table 3 below for reference. Refinements in plant operations over time are also evident in Outfall 001 discharge monitoring report (DMR) data as illustrated in the Poteau River Study. See Figure 2.

Table 3. Dissolved mineral concentrations at sites UT-2 and PR-2 by year

Site/Year(s)	Chloride (mg/L) (95th percentiles)	Sulfate (mg/L) (95th percentiles)	TDS (mg/L) (95th percentiles)
UT-2 (2011-2012)	180	200	870
PR-2 (2011)	190	219	901
PR-2 (2015)	150	100	708
PR-2 (2016-2018)	129	68	584

Figure 2. Sulfate Monthly Averages as Reported in Outfall 001 DMRs



Tyson Foods, Inc. proposed to establish new water quality criteria for chloride, sulfate and TDS in the unnamed tributary equal to instream water quality observed in 2011-2012. Likewise, it proposed new criteria in the Poteau River that are somewhat similar to instream water quality observed in 2011-2012. However, its criteria calculations for the Poteau River were slightly more stringent than they would have been based on 2011-2012 data alone, as they included minerals data collected well after 2013 when Tyson-Waldron's discharge quality began to improve significantly. Therefore, EPA's evaluation of the protectiveness of these criteria was based heavily on the quality of aquatic communities existing in 2011, and whether a return to water quality conditions represented by the revised minerals criteria will return aquatic communities to a condition similar to that observed in 2011.

Physical Habitat, Benthic Macroinvertebrate and Fish Community Analyses

As described in the Poteau River Study, habitat and benthic macroinvertebrate communities were evaluated at sites UT-2, PR-1, PR-2, and a fourth station on the Poteau River well downstream of Waldron, PR-3, in both spring and fall of 2011. Fish were sampled at the same four sites in fall 2011. In spring and fall of 2015, habitat and benthic macroinvertebrates were evaluated again at sites PR-1, PR-2, and PR-3, and at 3 new upstream sites on the Poteau River (PR-0.5, PR-0E, PR-0W) and a downstream 'reference' site on a tributary to the Poteau River called Jones Creek (JC-1). Site UT-2 was not resampled in 2015. See Figure 1 for locations of these sites.

Physical Habitat Analysis

Habitat assessments were conducted in 2011 and 2015 alongside biological collections to determine the relative potential of stream and river sites to attain and maintain aquatic life uses.

These assessments were conducted consistent with EPA's Rapid Bioassessment Protocols (RBPs) (USEPA 1989b). In 2011, habitat scores were generally uniform across the four sites across both seasons, with the exception of site UT-2. While the Poteau River sites were classified as 'sub-optimal' in both seasons, site UT-2 was classified as 'marginal' in the fall evaluation. This was attributed to historic channelization of this largely man-made stream that has resulted in homogenous habitat (primarily riffles) throughout its length. In 2015, such uniformity in habitat scores across all seven evaluated sites was also observed. All sites were classified as 'sub-optimal' across both seasons with only one exception, the upstream station on the east fork of the Poteau River (PR-0E) which was classified as 'marginal' in the fall. We suspect that this site is located on a small stream that receives less flow year-round as compared to the West Fork site and was likely experiencing little to no flow in the fall due to dry conditions. This likely drove the velocity/depth regime and channel flow status scores down as compared to the spring assessment. While the Poteau River Study does not fully describe why the Jones Creek site was identified as a 'reference' quality stream, other than its greater diversity of substrate sizes (large numbers of cobbles and boulders), it did have the highest habitat scores in the spring and fall of 2015 as compared to the Poteau River sites, but was still classified as 'sub-optimal' habitat. If Jones Creek is considered a reference quality site, this at least suggests that the sub-optimal classification for the Poteau River sites may, to some extent, describe their maximum habitat quality potential. The uniformity in habitat scores and classifications among Poteau River sites across seasons and between the two years of observation also suggest that physical habitat quality may be less of a factor in any variability observed in biological communities observed among Poteau River sites. However, this likely does not extend to site UT-2 and the unnamed tributary, whose habitat may indeed be a limiting factor in its full attainment of aquatic life uses.

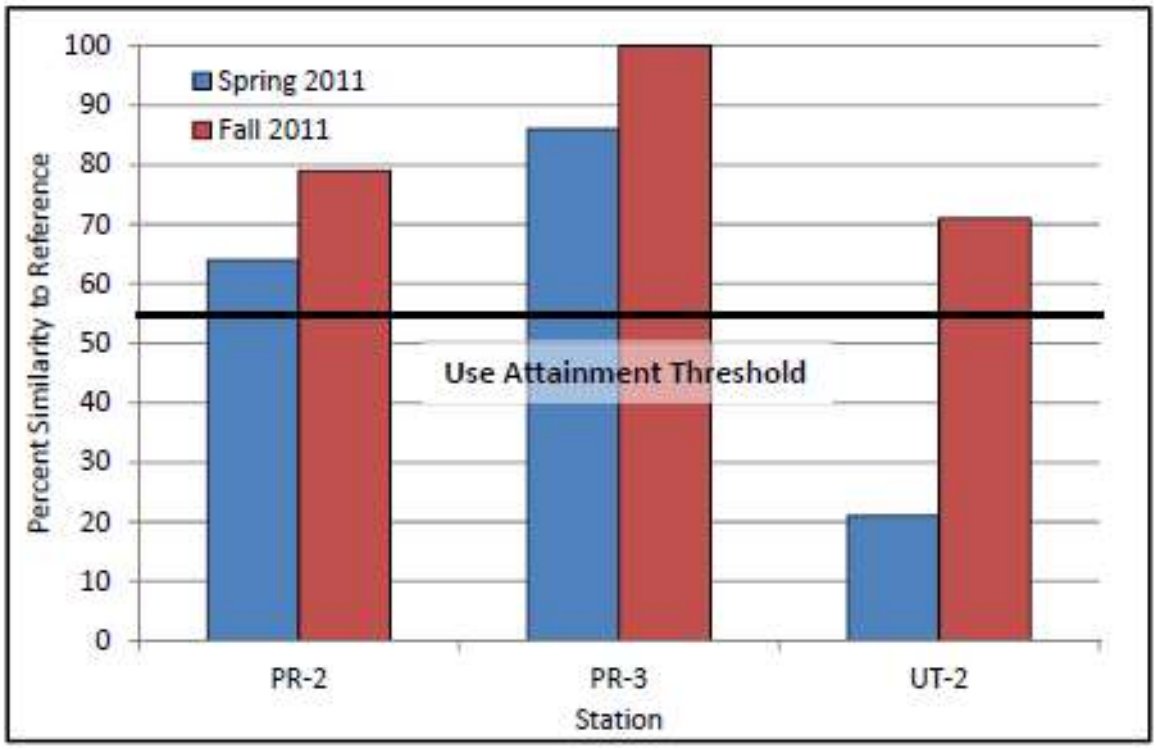
Benthic Macroinvertebrate Community Analysis

The ADEQ uses a multimetric scoring system for macroinvertebrate assessment that incorporates an adaptation of EPA's RBPs as a biotic index relying on 6 metrics including: taxa richness, EPT index, community loss index, Hilsenhoff biotic index, % contribution of dominant taxa, and ratio of EPT to Chironomidae abundance. This multimetric system was used to determine impairment based on comparative changes in the macroinvertebrate community structure and function.

Application of Arkansas's biological condition criteria to 2011 data using the above metrics showed that benthic macroinvertebrate percent similarity to upstream reference site PR-1 was above the minimum level (>53%) for concluding that the aquatic life use was being supported at sites PR-2 and PR-3 in both seasons. Percent similarity of the spring collection at site UT-2, however, was well below this cutoff while the fall collection was above it. See Figure 2 below. We suspect that the low degree of similarity noted at site UT-2 in the fall was related to the lack of channel habitat variability throughout the unnamed tributary and, as indicated by a number of benthic metrics for this site (elevated Hilsenhoff Biotic Index, reduced taxa/EPT richness and diversity indices, and a high number of annelids (leeches, oligochaetes), gastropods (physa), and dipterans (chironomids)), possible impacts from organic enrichment. Similar eutrophic conditions using these same metrics were evident at site PR-2 as well, although the stream was less impacted overall across both seasons. Enrichment at site PR-2 may have been

partly due to the illicit discharge from the city of Waldron's equalization basin and runoff from the livestock auction grounds upstream from site PR-1 noted in the Poteau River Study.

Figure 2. Scores for Poteau River macroinvertebrates collections according to the ADEQ Multimetric Scoring System



The Poteau River Study also applied Arkansas's biological condition criteria to those benthic macroinvertebrate data collected in the spring and fall of 2015. Macroinvertebrates at each station downstream of the Tyson Discharge (PR-2 and PR-3) were compared to the three stations that generally had the best community metrics (PR-0.5, PR-1 and JC-1). All similarity scores were well above 53% indicating support of the aquatic life use at these stations. See Figures 3 and 4 below. These results demonstrate that sites PR-2 and PR-3 have slightly improved levels of similarity with site PR-1 in 2015, which was a point of comparison in 2011. Various metrics from these collections continued to indicate some degree of organic enrichment as that seen in 2011, however, such metric data at PR-2 were largely similar to those at other sites in the Poteau River watershed unaffected by point sources.

Figure 3. Spring 2015 macroinvertebrate Use Support status based on Biological Condition Criteria.

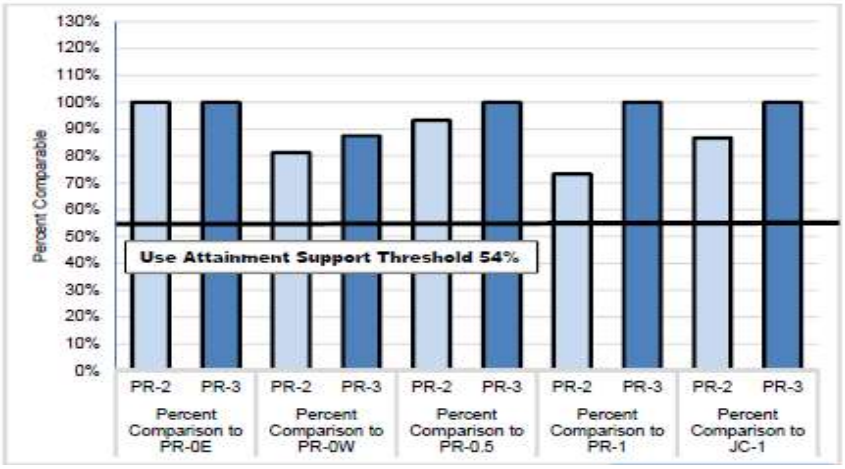
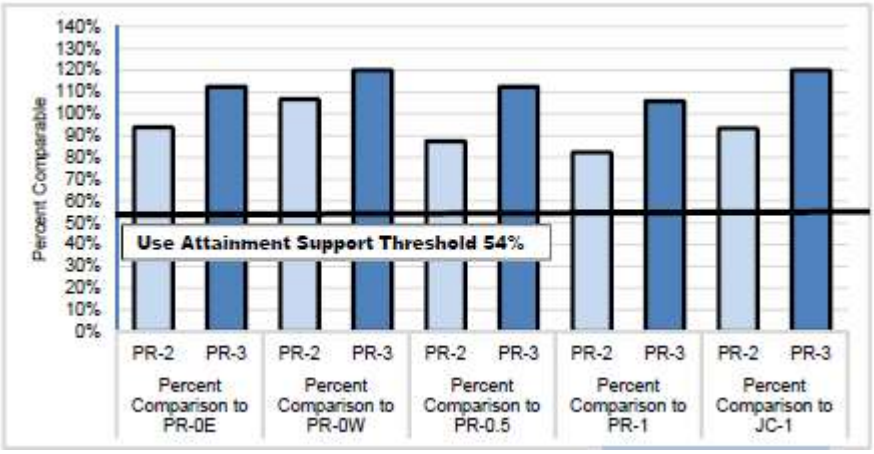


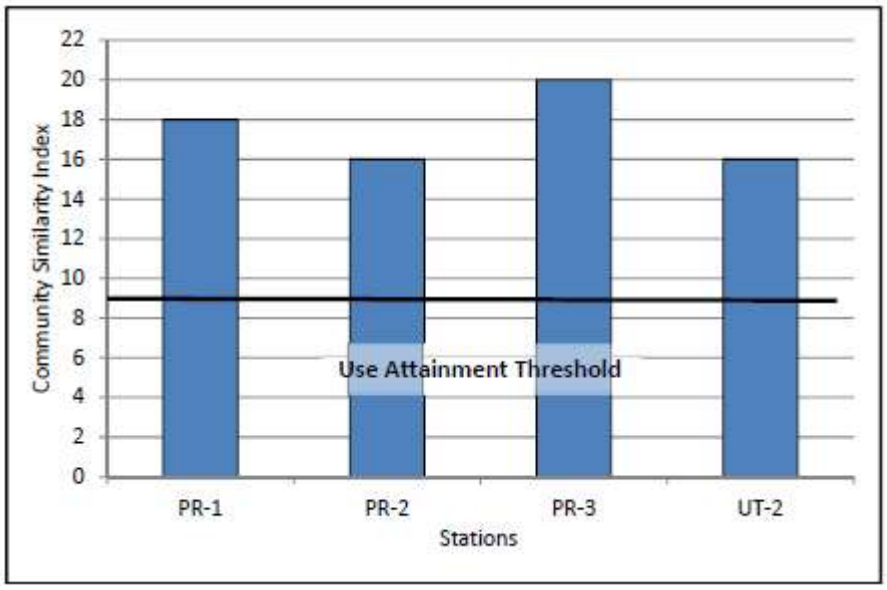
Figure 4. Fall 2015 macroinvertebrate Use Support status based on Biological Condition Criteria.



Fish Community Analysis

As previously noted, fish assemblages were collected one time in the fall of 2011 at sites PR-1, PR-2, PR-3 and UT-2. Fish community analyses typically consider abundance, diversity, sensitivity and species present as indicators of both water quality and habitat quality. Data were reported for each bioassessment site using nine key community metrics including ADEQ's ecoregion-based Community Structure Index (CSI) to compare reference to downstream bioassessment sites. Each metric is scored and summed for comparison to ecoregion reference scores to determine the level of support of the aquatic life use. In the Arkansas Valley ecoregion, the CSI score must be greater than 16 to determine support of the aquatic life use. The results of this analysis at each of the four sampled sites is illustrated in Figure 5 (please note that the use attainment threshold (9) in Figure 5 is incorrect based on Arkansas's 2018 assessment methodology (ADEQ 2018)). There was a slight difference in CSI scores between both sites PR-2 and UT-2 and the upstream reference site, PR-1.

Figure 5. Fish Community Structure (Similarity) Index comparison among sites



As noted in the Poteau River Study, the fish communities in the Poteau River reaches sampled were found to contain significant ecoregion "Key and Indicator Species" as identified in Arkansas Regulation No. 2. A direct comparison of the fishes collected at PR-1 and PR-2 indicates that the communities are fairly similar. However, the collection at PR-2 was superior to PR-1 in most metrics. PR-2 contained greater individual abundance, greater species richness, greater darter richness, greater species diversity, and a greater percentage of intolerant species compared to PR-1.

The fish community at PR-2 had a taxa richness of 18 and a Shannon-Wiener Diversity Index of 2.89, both increases relative to site PR-1. The PR-2 fish community trophic structure was dominated by insectivores, which made up 76.2% of the collection, followed by omnivores at 20.7%. The fish community was dominated by intolerant species at 56.9%, which was highest among all sites, followed by intermediate species (25.9%), and pollution tolerant species (17.2%). Four fish species were collected that were key and indicator species for the Arkansas River Valley. These four species comprised 43.4% of the fish community at PR-2. The key and indicator species numbers and percent composition at sites PR-1 and PR-2 were similar.

The fish community at UT-2 had a taxa richness of 13 and a Shannon-Wiener Diversity Index of 2.5, both decreases relative to the Poteau River sites. The UT-2 fish community trophic structure was dominated by insectivores accounting for 48.1% followed by herbivores at 45.3%. This large number of herbivores, primarily composed of the central stoneroller (*Campostoma anomalum*), was unique among the four sites sampled, indicative of significant organic enrichment at this site relative to the Poteau River sites. The fish community at UT-2 was dominated by species intermediate to perturbation at 63.3%, followed by intolerant species (18.7%), and pollution tolerant species (18.0%). Three key and indicator species comprised 23.9% of the fish community at UT-2, which was lowest among all sites.

Conclusions Regarding Habitat, Water Quality and Biological Data to Support the Revised Criteria

The EPA's obligation is to ensure that all water quality criteria adopted by the state are based on a sound scientific rationale and are protective of the most sensitive use, in this instance, the seasonal (unnamed tributary) and perennial (Poteau River) Arkansas River Valley aquatic life uses. Drawing conclusions based on the potential effect of the revised site-specific criteria based on the supporting data, like previous third-party rulemakings, continues to be challenging.

In summarizing the available habitat data, the Poteau River Study concludes that, although the Poteau River sites were generally classified as suboptimal, these stream and riverine areas appear to be able to maintain biological integrity under current conditions. While there was some variability in site scores within the suboptimal category, given the uniformity in classifications of habitat among the Poteau River sites in both impacted and unimpacted ("reference") areas upstream and downstream of the Tyson-Waldron facility, this conclusion appears reasonable. Habitat at these sites may indeed be attaining something similar to their maximum potential for this watershed. However, this conclusion likely does not extend to the unnamed tributary, which was rated as having 'marginal' habitat. Biological community health appears to be, at least in part, limited by habitat in this small, man-made, channelized stream. Although the physical habitat in the Poteau River may be capable of maintaining biological integrity, the water chemistry analyses, historic WET tests and biological assessments are critical in determining if the aquatic life use will continue to be attained.

In the unnamed tributary to the Poteau River in Waldron, we must rely strictly on habitat, water quality, toxicity, macroinvertebrate and fish data collected in 2011-2012. Chlorides, sulfates, and TDS data collected at that time served as the basis for the revised criteria in this segment. Benthic and fish assemblage metrics and indices for this site are indicative of some degree of impairment at this site. However, it is not entirely clear that these impacts are the result of the mineral concentrations observed in the stream at that time, or if nutrient loading from the outfall, nonpoint source/habitat impacts, or a combination of these stressors are contributing to the adverse effects. As noted previously, habitat at this site was not ideal and would likely inhibit establishment of diverse biological assemblages under the best water quality conditions, and various benthic macroinvertebrate and fish metrics were indicative of organic enrichment impacts likely due to excessive nutrients. Meanwhile, WET tests conducted in 100% effluent at the Tyson-Waldron outfall prior to and during 2011, and since that time, have shown almost no observable lethal or sublethal effects. Given that nutrient related toxicity is not assessed through WET tests because DO is controlled throughout the test as a required test condition, these findings are at least suggestive that the dissolved mineral ion magnitudes and composition being discharged from Tyson-Waldron in 2011 were perhaps not impacting instream communities as much as were nutrients and habitat. We acknowledge that there is some uncertainty as to whether shifts in the relative ion composition of the discharge, when comingled in a natural stream, may have an impact not predicted in tests on 100% effluent. However, we surmise that this shift would not have been significant in the unnamed tributary given the lack of perennial background flow in the stream and the much lower mineral content in the city of Waldron's downstream discharge.

In the Poteau River below the unnamed tributary, the revised criteria for chlorides, sulfates and TDS were based on data collected at site PR-2 between 2011 and 2016. The overall trend in minerals content continued downward since 2011 in following with the initiation of plant optimization at Tyson-Waldron in 2013. Given that the revised criteria will possibly return the dissolved minerals content in this reach of the Poteau River to levels similar to those seen at site PR-2 in 2011-2012, EPA also looked closely at biological assemblage health at that time as predictive of whether aquatic life uses will be attained under the new criteria. Based on similarity indices for benthic macroinvertebrates and fish presently being used by ADEQ, benthic macroinvertebrates met use attainment criteria for percent similarity to the upstream "reference" site, PR-1, in both 2011 and 2015. Some improvement in this metric was observed between years, possibly due to decreases in mineral content due to improved plant operations, but perhaps more likely due to the correction of localized point and non-point sources of nutrients in the vicinity of PR-2 (e.g. illicit discharge from city of Waldron). While there remained some indication of organic enrichment at site PR-2 in 2015 based on some metrics (e.g. high % dipterans), these metrics showed some improvement between years. Based on a single fish assemblage collection in October 2011, a slight difference in fish CSI scores between PR-1 and PR-2 was noted, although an evaluation of key metrics such as abundance, taxa richness, species diversity, and percent of intolerant species suggests an improvement of the fish community at PR-2 as compared to PR-1. CSI scores at both sites were marginally below (PR-2) and above (PR-1) ecoregion reference values listed in Arkansas's 2018 assessment methodology used to identify attainment of aquatic life uses (ADEQ 2018). We acknowledge that this finding poses problems with making a conclusive determination as to whether this slight impairment is due to instream dissolved minerals observed in the river at that time. However, based on the weight of the evidence, including a functioning benthic community, apparent nutrient/organic enrichment signatures in benthic macroinvertebrate metric data at site PR-2, a similar (although marginally attaining) fish CSI score at PR-1, and the apparent insignificance of water toxicity in WET tests at the Tyson-Waldron outfall, we conclude that any reduction in fish assemblage quality due to instream dissolved minerals concentrations observed in 2011 is unlikely. We regret that additional fish assemblage data were not available to further confirm the above findings.

IV. Revised Provisions EPA is Approving

Based on the available information, EPA concludes that the seasonal and perennial Arkansas River Valley aquatic life uses for the unnamed tributary from Tyson-Waldron Outfall 001 to the confluence with the Poteau River and the Poteau River from its confluence with the unnamed tributary in Waldron, Arkansas to Scott County Highway 59 are expected to remain attainable upon approval of site-specific criteria for chlorides, sulfates and TDS. Based on the weight of the evidence provided, the revised site-specific criteria detailed in Table 1 are approved pursuant to Sec. 303(c) of the CWA. Upon approval by EPA, these criteria are in effect for all CWA purposes.

V. Additional Considerations

Antidegradation Requirements

Federal regulations require states to develop antidegradation implementation methods for the antidegradation policy that are, at a minimum, consistent with the state's policy and with 40 CFR 131.12(a). Neither Regulation 2 nor the state's Continuing Planning Process (CPP) document (2000) currently contain implementation methods for the state's antidegradation policy. It is EPA's understanding that ADEQ is working to develop implementation methods and will likely incorporate methods in the next iteration of its CPP. It is important to note that the state is required to provide an opportunity for public involvement during the development of, and during any subsequent revisions of, the state's implementation methods and that the final version of the implementation methods must be available to the public. See 40 CFR 130.5(b)(6) and 40 CFR 131.12(b). While not required for EPA's approval of the state's revised site-specific criteria for the unnamed tributary to the Poteau River and the Poteau River below the confluence with the unnamed tributary, the development of these implementation methods is critical for the proper implementation of the site-specific criteria that the state has adopted.

Antidegradation is an integral part of a state's or tribe's water quality standards, as it provides important protections that are critical to the fulfillment of the CWA objective to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The federal regulations outline requirements for three tiers of antidegradation protection: protection for existing uses (Tier 1), protection for high quality waters, where the quality of the water exceeds levels necessary to support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water (Tier 2), and protection for outstanding national resource waters (Tier 3). Antidegradation is broadly applicable to all pollutant sources, all water bodies, and at all times, but it is most commonly triggered through activities that could lower water quality and are regulated. No permit may be issued without an antidegradation review to a discharger to high-quality waters with effluent limits greater than actual current loadings, if such loadings will cause a lowering of water quality (USEPA, 1989a). The antidegradation review will assure that the applicable level of protection is being provided to that water body.

Water quality data along with physical, chemical, and biological data from representative reference stream locations within the Poteau River watershed establish the baseline conditions for these waters and should be used for the purpose of an antidegradation review. Where water quality is better than the levels necessary to support the CWA Sec. 101(a)(2) uses, the state must conduct a Tier 2 antidegradation review, including an analysis of alternatives, to find that a lowering of high-water quality is "necessary to accommodate important economic or social development in the area in which the waters are located." The EPA anticipates that ADEQ will conduct a Tier 2 antidegradation review, as required by 40 CFR 131.12(a)(2)(i), to evaluate the use of assimilative capacity in allowing discharges of chloride, sulfate and TDS during the NPDES permitting process. The full requirements of a Tier 2 review can be found at 40 CFR 131.12(a)(2).

Endangered Species Act Consultation

EPA's approval of revised aquatic life water quality standards (WQS) is subject to the consultation requirement of Section 7(a)(2) of the Endangered Species Act (ESA). Under Section 7(a)(2) of the ESA, 16 U.S.C. §1536, EPA has the obligation to ensure that its approval of these modifications to Arkansas's Regulation 2 will not jeopardize the continued existence of threatened and endangered species and their critical habitat in Arkansas. EPA initiated consultation with the USFWS-Conway Field Office regarding the effects of EPA approving a change to Arkansas's Regulation 2 for chlorides, sulfates and TDS applicable to the Poteau River and the unnamed tributary to the Poteau River in Waldron, Arkansas on May 15, 2020.

EPA considered the available information in the literature, looking primarily at how increases in chloride, sulfate, and TDS (**Table 1**) would affect the listed species within the defined action area that encompasses portions of the Poteau River and its unnamed tributary. There are no nationally recommended water quality acute/chronic criteria for aquatic life for sulfate and TDS, however, the revised criteria for chloride that Arkansas has adopted is well within the federally recommended limits. The EPA has determined that the approval of site-specific mineral criteria adopted by the APC&EC for the unnamed tributary from Tyson-Waldron Outfall 001 to the confluence with the Poteau River and the Poteau River from its confluence with the unnamed tributary in Waldron, Arkansas to the Scott County Highway 59 bridge, may affect, but are not likely to adversely affect the Northern Long-eared Bat (*Myotis septentrionalis*), Piping Plover (*Charadrius melodus*), and Red Knot (*Calidris canutus rufa*). The EPA determined that the revised criteria will have no effect on the Red cockaded Woodpecker (*Picoides borealis*) and American Burying Beetle (*Nicrophorus americanus*). The USFWS-Conway Field Office concurred with EPA's determination on May 18, 2020.

VI. References

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