

ADEQ

ARKANSAS
Department of Environmental Quality

October 12, 2012

Mr. Shon Simpson
GBM^c and Associates
219 Brown Lane,
Bryant, Arkansas 72022

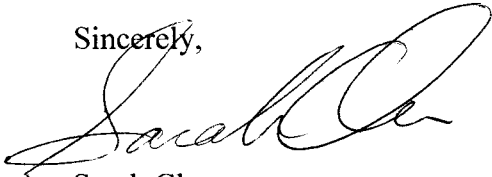
Re: Poteau River-Section 2.306 Site Specific Water Quality Study Tyson Foods, Inc. Waldron

Dear Mr. Simpson,

Thank you for the submission of the above Site Specific Water Quality Study on behalf of GBM^c and Associates for Tyson Foods, Inc. Waldron, AR. The Department staff has reviewed the document and has several concerns regarding significant findings and recommendations, along with several minor clarifications throughout the report. These clarifications and concerns should be addressed prior to moving forward with the third-party rulemaking process.

If you have any questions you may contact me at 501-682-0660 or by e-mail at clem@adeq.state.ar.us.

Sincerely,



Sarah Clem
ADEQ Branch Manager
Water Quality Planning Section
Water Division

Cc: John Couch, Tyson Foods, Inc.

Attachment

2.0 SIGNIFICANT FINDINGS AND RECOMMENDATIONS

Recommendations

- 2.1(2) The actual flow of a stream the appropriate flow for developing site specific criteria. Critical flow of 4.0 cfs is not appropriate (as requested). Critical flow of 7Q10 was used in the existing UAAs for the unnamed tributary and the Poteau River from Business Hwy 71 to the Oklahoma state line.

Significant Findings

- 2.2 (1) Macroinvertebrates were found at all sample locations; however, the mere presence of macroinvertebrates is not indicative of healthy communities or that designated uses are being attained. ADEQ staff re-analyzed GBMc's 2011 spring and fall macroinvertebrate assemblage data following ADEQ and Pflakin et al. (1989) Rapid Bioassessment methodology (Tables 1 and 2 within this document). The most marked differences in macroinvertebrate assemblages from PR-1 to the other sites were noted during spring 2011. Specifically, decreases were noted from PR-1 to PR-2 among taxa richness (both seasons), EPT richness (spring), EPT abundance (spring), and diversity (both seasons). The data indicates the assemblage below the confluence of the unnamed tributary are slightly impaired through two seasons.
- 2.2 (2) ADEQ staff does not dispute the toxicity record; however, it is inaccurate to state that mineral levels "do not interfere with organism health or attainment of designated uses." Though WET testing indicates no toxicity the instream aquatic community reflects a slight impairment. Toxicity alone is not enough evidence to state that minerals do not alter community or individual health.
- 2.2 (3) Habitat quality scores for PR1 and PR2 were sub-optimal with only 0.3 "points" difference. As expected there were also similarities among percentages of stable instream habitat for fish and macroinvertebrates between these sites. Consequently, it is unlikely that biological differences between these sites are attributable to habitat stability or quality.
- 2.2 (4) & (5) Results of the Pearson-correlation tests indicate TDS concentrations in the Poteau River (PR-2) were most related to those of the unnamed tributary ($p=0.0008$, significant; $r=0.83$). Additionally, TDS concentrations in the unnamed tributary were related to Tyson-Grannis outfall 001 ($r=0.73$). Pearson correlations for TDS between PR-1 and PR-2 were the least similar ($r=0.54$) and not significant ($p=0.0723$).
- These results indicate that TDS is contributed from the Tyson outfall.
- 2.2 (6) Conclusions were made implicating non-point source as the causal factor for sporadic elevated minerals at the upstream site. Analyzing ADEQ data for the upstream ambient station RED0054, mean TDS concentrations for the duration of this study was 79.3mg/L with a range of 8 to 175 mg/L (Figure 1 within this document). The maximum TDS concentration at RED0054 was reported six days prior to the maximum reported for PR-

1, 810 mg/L TDS. However, the upstream non-point sources discussed within this report would unlikely augment upstream mineral concentrations; rather they would influence sediment and organic loads. Depending on the location of collection, whether nearest the upstream or downstream most point, it is possible that spurious mineral concentrations at PR1 were reported due to the zone of mixing and back-flooding present at the confluence.

2.2 (7) Certain parameters were examined from ADEQ monitoring stations ARK0054 (upstream) and ARK0055 (Hwy 71 bridge between PR-1 and PR-2). For all minerals and total phosphorous, there is a marked increase in concentrations at the downstream station. These are not “typical” of an Arkansas River Valley Ecoregion. All available data should be reviewed, not just in situ measurements taken during the study period in order to gain an overall view of the stream chemical parameters.

2.2 (8) Please see comments on 2.2(1).

2.2 (9) It is unlikely that differences in community compositions are due to organic enrichment. Biotic Index scores ranged from 6.65 to 7.7 across both seasons; which does indicate (according to HBI; Hilsenhoff 1987) “significant” to “very significant” perturbation due to organic loading; however, these scores are so similar that differences in biotic communities between sites cannot be attributed to organic enrichment.

Biotic communities are not typical of streams with significant organic enrichment. ADEQ staff re-analyzed GBMc’s fish assemblage data and noted that only 18.6%, 15.6%, and 17.9% of fish assemblages for PR1, PR2, and PR3, respectively were Primary Trophic Feeders. This evidence suggests that organic loading from non-point sources is not affecting trophic structure in fishes. Following ADEQ’s Community Structure Index (CSI) each score would indicate low-level nutrient conditions. In moderate to severely eutrophic streams relative abundance of TFL’s would generally be greater than 50% of the fish assemblage.

2.2 (10) Fisheries use attainment is, in part, evaluated by the presence of key and indicator species. Key species are typically dominant for a given ecoregion. Four of six key species were collected within the study; however, for two of the four families the key species was not the dominant species collected. Indicator species are typically not necessarily the dominant species within their respective family, but whose presence is associated with a specific ecoregion. Two of the three Arkansas River Valley indicator species were collected during the study, however they were collected in extremely low numbers (2 and 3 individuals) and were only collected in PR-3.

2.2 (11) ADEQ staff re-analyzed GBMc’s fish assemblage data following ADEQ’s CSI and determined that both PR1 and PR2 are ‘generally similar’ to Arkansas River Valley ecoregion streams. With that said, PR2 fish assemblage had lower relative abundance of

percids and only slightly lower relative abundance of designated key species. A higher percentage of pollution intolerant species was collected at PR-2 than any other site, however, the percentage of pollution tolerant species was more than double for PR-2 than PR-1. Total richness, darter richness and sunfish richness was similar between PR-1 and PR-2.

2.2 (12) While non-point sources and un-permitted discharges may exist above and within the study reach, no effort was made during the study to quantify these contributors. There are two sources of organic nutrient loading documented for the study sites: a livestock auction above PR-1 and unauthorized discharge of the City of Waldron's Equalization basin in UT-2. Only additional sampling directly above and below each suspected source (livestock auction, Tyson, city of Waldron WWTP, landuse contributors, etc.) will reveal the contribution of each source. Regardless of source, minerals (and other parameters) are elevated from upstream to downstream (data from ARK0054 and ARK0055).

Non-point sources on the Poteau River and the unnamed tributary contribute to organic loading; however, the HBI scores are so similar throughout the entire study area that macro community structure differences cannot be attributed to organic loading. HBI scores (measure of organic pollution) are slightly better (lower) at PR-1 than PR-2. The highest HBI score was actually reported from UT2.

Tyson-Waldron Poteau River WQ Study General Comments

The Department noticed inconsistencies and deviations from the approved work plan dated March 2, 2011; which are further discussed herein.

Data provided within the site specific water quality study suggest a negative impact on aquatic life from the influence of Tyson Foods, Inc.-Waldron. Data suggest that effects from unnamed tributary (UT-2) lowers macroinvertebrate community quality (i.e. taxa richness, EPT richness, EPT abundance, and diversity) in the Poteau River (PR-2). Downstream macroinvertebrate recovery is evident in the Poteau River (PR-3) from similarity to assemblages above the Tyson-Waldron influence. Biotic assemblage differences between PR-1 and PR-2 do not appear to be attributed to habitat or organic loading, as evident in the similar biotic index and habitat potential scores reported within this study for all sites. It is, therefore, more likely that elevated mineral levels are responsible for community differences from PR-1 to PR-2.

Inconsistencies were noted for current mineral criteria for the proposed reaches. In the most recent version of Regulation No. 2 (August 2011), mineral criteria for the Poteau River from Highway 71B (not Highway 71) to the Oklahoma state line are: chlorides 120mg/L; sulfates 60 mg/L; and TDS 500 mg/L. Subsequently, it seems in error that the Poteau River reference reach (PR1) is reported as supporting ecoregion mineral criteria.

Two ambient monitoring stations are within proximity of the study area. ARK0054 is located at the Highway 80 bridge ~3 river miles upstream of PR-1 and well outside any effects of Tyson-Waldron or the City of Waldron outfalls. ARK0055 is located just downstream of the unnamed

tributary that receives both Tyson-Waldron and the city of Waldron's outfall. Data evaluated from 1990 to 2012 show significantly lower levels for chlorides, sulfates, and TDS ARK0054. Specifically, mean TDS concentrations for the duration of this study was 79.3mg/L with a range of 8 to 175 mg/L (Figure X). As expected, elevated minerals levels are reported from ARK0055.

Two macroinvertebrate sites have historical data within this area (available on the ADEQ website; macroinvertebrate database). One site (ADEQ3I-2) is located ~1.25 river miles upstream of the upstream boundary of PR-1. Data from spring of 1994 showed total taxa richness and EPT richness similar to PR-1, PR-2, and PR-3 (spring); however, ADEQ3I-2 scored much higher in EPT abundance (47.92%) than any other site sampled in the spring of 2011 (0.0% to 26.5%). Additionally, more shredders and scrapers were collected at ADEQ3I-2 than at any site sampled in 2011. These are more sensitive groups than other functional feeding groups (Barbour *et al.* 1999). HBI was 4.69 at ADEQ3I-2, better than any other site from 2011.

A second site, ADEQ3I-5, located just upstream of Hwy 80, and within PR-3, was sampled in June 2002. Total taxa was lower at ADEQ3I-5 in 2002 than PR-3 in 2011; however, EPT richness was the same, and %EPT abundance was almost double in 2002 than in 2011. Similarly, HBI score was lower in 2002 than in 2011. Functional feeding groups were similar in terms of tolerant/intolerant in 2002 and 2011.

Beyond what is described above, there were additional errors within this report: appendices were incorrectly referenced within the text, data tables were duplicated (Appendix F), and dates did not match up (habitat data). Below are several clerical clarifications and discrepancies noted by ADEQ staff.

5.0 FIELD STUDY

5.1 Specific concerns focus around consistency and data gaps. In the agreed upon work plan, it was stated that water quality would be assessed at the downstream most station (PR-3) and habitat would be assessed spatially and temporally. The report does not indicate water quality was assessed but only aquatic life. Please clarify.

5.2 Habitat measurements were taken in both April and October according to the report; however the raw data was duplicated, labeled October, in Appendix F. Additionally the raw data was specifically dated October 18 and 19, 2011 but Table 5.1 is dated April 19 and October 13. Please clarify.

Please provide methods used in calculating habitat scores. Section 5.2 stated that, "habitat potential was evaluated using procedures adapted from EPA's rapid bioassessment protocols (Barbour, et al., 1999)." Please provide the adapted method.

Table 5.1 and Figure 5.3 Please discuss spring and fall habitat assessments independently, rather than combining results.

5.3 Please provide accurate site localities (i.e. lat/long), as station information provided in Appendix F and in Figure 6.8 indicate reaches PR-1 and PR-2 overlap.

5.4.3 Although, diurnal studies were not included within the agreed upon work plan, it seems as though one deployment at one site is insufficient representation and should either be removed or diurnal studies for the other sites should be reported and compared.

5.4.4 As stated in the report, the average values for TDS and chloride were lower than the standards at PR-2 and UT-2; however, minerals are evaluated (for permits) as monthly averages, not yearly averages. Standards were exceeded in 50% and 42% of the time for both TDS and chloride respectively at PR-2 and 67% and 50% of the time at UT-2. This conclusion is a more accurate representation of the minerals values at these sites.

5.5 Benthic Macroinvertebrate Community

From PR-1 to PR-2 total taxa decreased for both spring and fall; EPT richness and abundance decreased in the spring, but increased in the fall; diversity was higher for PR-2 for both spring and fall; and HBI scores increased downstream. Generally, the community scored poorer downstream of the unnamed tributary. When compared to the habitat scores, PR-2 scored minimally better than PR-1 (13.2 and 12.9, respectively) consequently, habitat does not account for poorer macroinvertebrate scores between these two reaches. Similarly, minerals concentrations increased downstream of the unnamed tributary.

5.6 Fish Community

5.6.2 Please provide the date of fish and macroinvertebrate community sampling. If the fish community was sampled on the same day, in the same location, prior to macroinvertebrate data this possibly disturbed the macroinvertebrate community.

Figure 1. Total Dissolved Solid concentrations (mg/L) from ARK0054 and ARK0055 during the study. The TDS site specific standard of the study area is also noted.

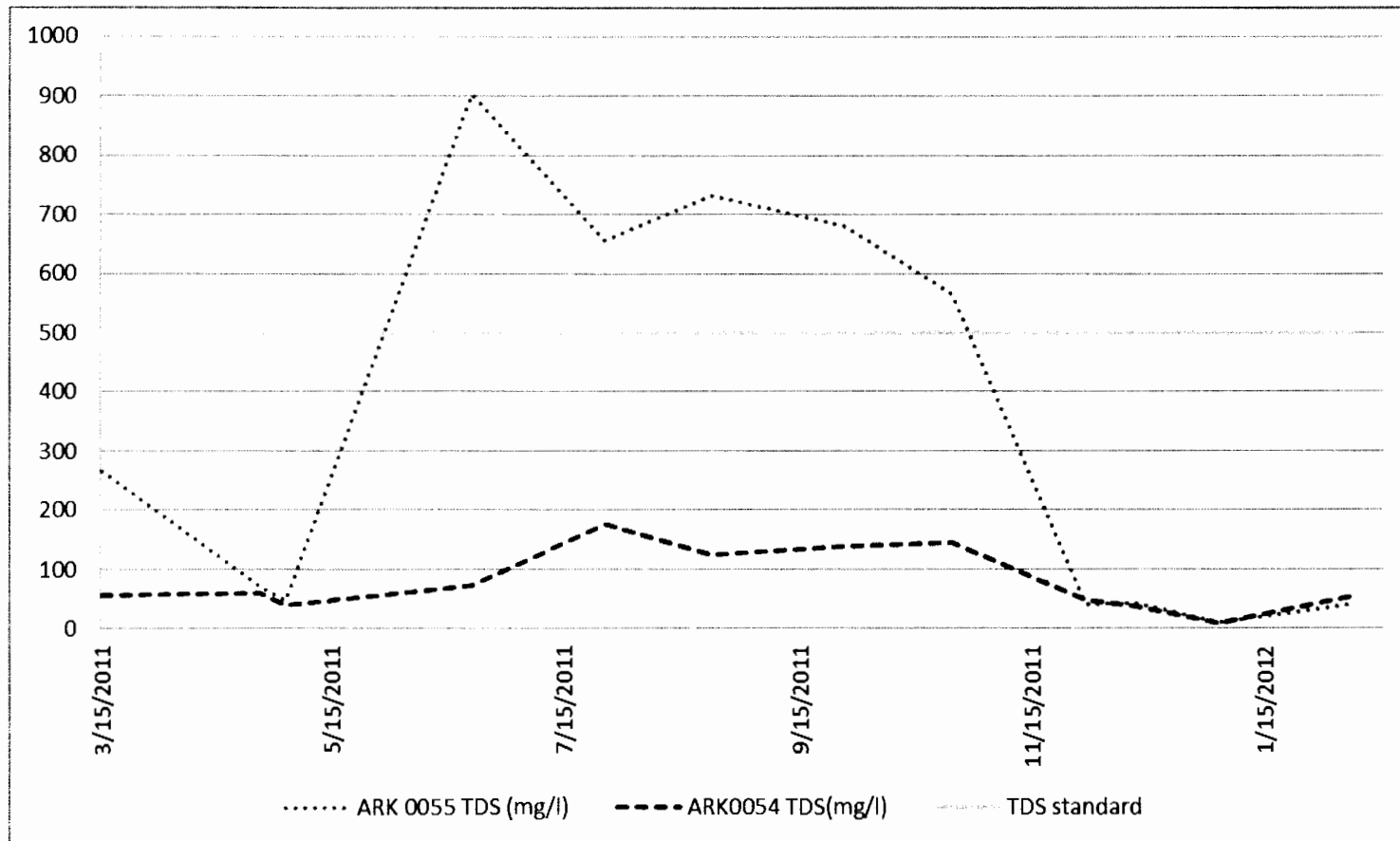


Table 1. Spring 2011 Bioassessment metric values and metric scores for Poteau River and Unnamed Tributary.

Spring 2011				
Bioassessment Metrics	PR-1 (reference)	PR-2	PR-3	UT-1
Taxa Richness	---	67	93	30
EPT Index	---	50	83	0
Community Loss Index	---	0.65	0.5	4.2
Hilsenhoff Biotic Index	---	91	94	94
% Contribution of Dominant Taxa	30	68	43	53
Ratio of EPT and Chironomid Abundance	11	2.6	38	0

Bioassessment Scores	PR-1 (reference)	PR-2	PR-3	UT-1
Taxa Richness	6	4	6	0
EPT Index	6	2	6	0
Community Loss Index	6	4	4	0
Hilsenhoff Biotic Index	6	6	6	6
% Contribution of Dominant Taxa	4	0	0	0
Ratio of EPT and Chironomid Abundance	0	0	2	0
Total Score	28	16	24	6
% Comparison to Reference		57.14	85.71	21.43
Impairment Status	reference	slightly impaired	non-impaired	moderately impaired

Table 2. Fall 2011 Bioassessment metric values and metric scores for Poteau River and Unnamed Tributary.

Fall 2011				
Bioassessment Metrics	PR-1 (reference)	PR-2	PR-3	UT-1
Taxa Richness	---	57	11	46
EPT Index	---	200	400	50
Community Loss Index	---	1.2	0.3	1.5
Hilsenhoff Biotic Index	---	89	99	88
% Contribution of Dominant Taxa	31	63	29	29.7
Ratio of EPT and Chironomid Abundance	38	23	82	100

Bioassessment Scores	PR-1 (reference)	PR-2	PR-3	UT-1
Taxa Richness	6	2	0	2
EPT Index	6	6	6	0
Community Loss Index	6	4	6	2
Hilsenhoff Biotic Index	6	6	6	6
% Contribution of Dominant Taxa	2	0	4	4
Ratio of EPT and Chironomid Abundance	2	4	6	6
Total Score	28	22	28	20
% Comparison to Reference		78.57	100.00	71.43
Impairment Status	reference	slightly impaired	non-impaired	slightly impaired