

Ohio EPA Response to Comments
Draft Biological and Water Quality Report – Southeastern Ohio River Tributaries
August 2019

The Draft Selected Southeastern Ohio River Tributaries Biological and Water Quality Report was made available for stakeholder review and comment from February 15, 2019 to March 18, 2019. The Agency received comments from American Electric Power (AEP), Gavin Power, LLC and Midwest Biodiversity Institute, Inc. (MBI).

The comments are summarized and grouped into categories with the name of the commenter following the comment in parenthesis.

Overall/General Comments

Comment 1: AEP does not object to the recommended revised aquatic life use designation for Kyger Creek, downstream of Jessie Creek to the confluence with the Ohio River (Modified Warmwater Habitat – Mine Affected). This proposed change reflects improvements to biological index scores in this portion of the creek. (AEP)

Response 1: Noted. Ohio EPA agrees that water quality has improved in Kyger Creek. OAC 3745-1-07 specifically states that LRW- AMD streams are surface waters with sustained pH values below 4.1 s.u. or with intermittently acidic conditions combined with severe streambed siltation and have a demonstrated biological performance below that of the modified warmwater habitat biological criteria. In Kyger Creek, pH was typically above 7, acidity was less than detect, the macroinvertebrates were meeting WWH, and there was no evidence of acute toxicity.

Comment 2: Comments on Study Area Description (p. 16 – 21): we recommended that language be added that explains the statistical methods used in the multivariate analysis of water quality data. Most of the graph plots (e.g., Figure 18) indicate that plots were made using ordination analysis. The plots look like outputs of principal component analyses. Clarification on this would be useful. (AEP)

Response 2: Page 51 has a brief description of the analysis methods.

Comment 3: 1st paragraph at page 22. In the third line, revise “from flue gas scrubbers” to read “from a flue gas desulfurization wastewater treatment plant”. (AEP)

Response 3: This has been corrected.

Comment 4: Page 22, 3rd paragraph. The last sentence in this paragraph states that manganese levels at Kyger Creek Plant Outfall 005 were such that they “eventually approaching levels toxic to aquatic life by 2014;”. In looking at Figure 9b (p. 24), the highest median manganese concentration is about 400 ug/L (0.4 mg/L). If these levels are considered to be potentially toxic, reference citations need to be provided to support

this statement. Effluent manganese concentrations less than 1.0 mg/L likely do not have the potential to cause acute or chronic toxicity. (AEP)

Response 4: Citations have been added to the BWQR. The citations include:

Nagpal, N.K., 2001. Ambient water quality guidelines for manganese. Ministry of Environment and Parks, Water Management Branch, Resource Quality Section, Victoria, BC, Canada

Reimer, P.S., 1999. Environmental effects of manganese and proposed freshwater guidelines to protect aquatic life in British Columbia. Department of Chemical & Bio-Resource Engineering, University of British Columbia.

Manganese concentrations were plotted on hardness for sites draining < 200 mi² in the Western Allegheny Plateau ecoregion. All values are geometric means of samples collected during the summer index period (June-October) and expressed in mg/l. The plotted manganese concentrations for Kyger and Little Kyger Creeks are a function of hardness and compared to the British Columbia criterion. Data from the Kyger Creek survey in 2008 exceeded the British Columbia value and data from 2015 were approaching the specified value.

Also, manganese explains significant variation in a logistic regression model relating attainment of macroinvertebrates in WAP headwaters to water quality (sulfate, pH and manganese) and habitat quality (QHEI).

Comment 5: Page 25, Figure 10. The current effective NPDES permit for Kyger Creek Plant does not contain effluent limitations for Outfall 028. Thus, the reference that an effluent limitation for total mercury of 67 ng/L at this outfall should be deleted. (AEP)

Response 5: The effective NDPEs permit at the time of the 2015 survey (01B00005*PD) contained an effluent limit for mercury of 67 ng/L at Outfall 028. The referenced figure displays the monthly concentration limit in the effective permit at that time, not the monthly concentration limit in the most current NDPEs permit.

Comment 6: Page 34, Figure 19. The concentrations of chromium in the colored circles are provided at the picogram per liter level. This level is beyond current analytical capabilities. The number of significant digits should be reduced. Same comment for Figure 20, page 35. (AEP)

Response 6: The caption has been revised to clarify that the units are log₁₀ (concentration in µg/l x 1000).

Comment 7: Page 41, Table 5 and Page 42, 4th paragraph. These sections indicate that monitoring data for locations in Kyger Creek exceeded the water quality criterion for specific conductivity. However, Table 35-1 in OAC 3745-1 does not specify a numeric water quality criterion for specific conductivity. Clarification is needed concerning this. (AEP)

Response 7: The statewide water quality criteria for the protection of aquatic life is listed in OAC 3745-1-35 Table 35-1. The outside mixing zone average (OMZA) column for dissolved solids, the value is 1500 mg/l with a foot note that states the “Equivalent 25°C specific conductance value is 2400 micromhos/cm”.
<https://www.epa.state.oh.us/portals/35/rules/01-35.pdf>

Comment 8: Page 50, Figure 26. Suggest that a linear regression equation (with corresponding r-squared value) be indicated in the figure. (AEP)

Response 8: The regression line is a visual aid used to show that sites in the SEORT study area are performing differently than the WAP reference population.

Comment 9: Page 55, Table 9. The units for manganese, sulfate, and alkalinity should be indicated at the top of the table. (AEP)

Response 9: The table has been revised.

Comment 10: *Gavin Power disagrees that the Limited Resource Water criteria currently in place for Kyger Creek should be re-designated as “Modified Warmwater Habitat – Mine Affected” at this time.*

In the study, Ohio EPA does not conclude that Kyger Creek is in attainment with the proposed designation nor is evidence presented concluding that Kyger Creek can attain Modified Warmwater Habitat - Mine Affected in the future. The study states that there is steady improvement of fish and macroinvertebrate performance, but one year of data showing higher scores is insufficient to show steady improvement. While we agree that improving water quality is a shared goal, it is premature, at this point, to use the limited information presented in the study to conclude water quality in Kyger Creek has improved to the degree where a higher water quality designation is appropriate. (Gavin Power)

Response 10: Kyger Creek is similar to other mine-affected streams in the ecoregion that have been re-designated from LRW-Acid Mine Drainage (AMD) to a higher aquatic life use. The type of mine drainage in Kyger Creek is non-acidic mine drainage (alkaline mine drainage) characterized by high conductivity, high metals but neutral pH. Streams designated LRW lack the potential for any resemblance of any other aquatic life habitat as determined by biological criteria and must demonstrate that the potential for recovery of the fauna to the level characteristic of any other aquatic life habitat is realistically precluded due to natural background conditions or irretrievable human induced conditions. Additionally, streams designated LRW-AMD are surface waters with sustained pH values below 4.1 s.u. or with intermittently acidic conditions combined with severe streambed siltation and have a demonstrated biological performance below that of the modified warmwater habitat biological criteria. Kyger Creek does not meet these criteria. In the currently designated LRW-AMD reach of Kyger Creek, 5/6 of the biocriteria is attaining MWH-MA. The aquatic macroinvertebrate assemblages sampled from this reach in 2015 were exceptional to marginally good, fully attaining WWH. Aquatic macrohabitat, as indicated by the QHEI, is fully expected to be able to support a

non-LRW ALU, rating good to excellent. Ohio EPA collected data from Kyger Creek in 2008 and the biological scores have significantly improved since that survey.

Comment 11: Kyger Creek continues to be affected by acid mine drainage and the study must make this clear. In some portions of the study this fact is asserted, but on page 67, there is a contradicting statement that "acid mine drainage does not appear to be an underlying source of impairment as pH was normal ... " OEPA erroneously uses this information to conclude that a portion of Kyger Creek should no longer be designated as Limited Resource Water.

A 2018 biological study conducted by EnviroScience confirms the existence of Limited Resource Water ("LRW"), affected by acid mine drainage, upstream of Gavin Power's outfalls in Turkey Run and Stingy Run, tributaries of Kyger Creek. Specifically:

- Water quality in Turkey Run and Stingy Run was similar to what the Ohio EPA measured in 2008. In Turkey Run, downstream of Gavin Power's Outfall 007, conductivity, and iron concentrations decreased relative to 2008, but sulfate concentrations increased slightly. In Stingy Run, downstream of Gavin Power's Outfall 009, conductivity and sulfate concentrations increased relative to 2008, but iron concentrations decreased.
- Biological metrics confirmed attainment of Limited Resource Water uses, but not Modified Warmwater Habitat.

Low pH, an indicator of acid mine drainage, is regularly documented by Gavin during state-required regular groundwater monitoring in the area, including groundwater directly feeding Kyger Creek:

- Groundwater in shallow aquifers, as well as recorded in groundwater intercepts in and around Gavin Power, have consistently shown high levels of sulfates and other components of acid mine drainage, as evidenced in Gavin Power's semi-annual and annual groundwater monitoring reports submitted to Ohio EPA. Accordingly, this portion of Kyger Creek should remain LRW.

Coal mining at the surface and underground was widespread in the immediate area prior to the 1970's:

- Abandoned surface and underground mines surround the area with remnant exposed coal seams and auger holes seeping water and material into surface water adjacent to the Stingy Run Fly Ash Reservoir. Some of this historic information was included in the draft water quality study, but more detailed information is available on the mining website from the Ohio Department of Natural Resources. The significance of this recent history of land use and its continued impact on water quality must be captured in the study, but these facts have not been included in the study.

Gavin Power takes steps to buffer pH in landfill leachate pond treatment and deploys limestone rock over the final cap as the Stingy Run Fly Ash Reservoir is closed. These steps may have skewed the data and contributed to Ohio EPA's conclusion:

- Gavin Power adds caustic to landfill pond effluent to treat various parameters, which also adds alkalinity that may skew Ohio EPA's data and its conclusion that acid mine drainage is no longer indicated because of normal pH levels in the receiving stream.

- **A groundwater intercept (GWI) below the landfill liner generally presents low pH as documented in Gavin Power's landfill groundwater reports submitted to OEPA.**
- **As part of the Fly Ash Reservoir closure project data is collected in creeks upstream of Stingy Run showing low pH coming in and neutral pH after the limestone ditches. (Gavin Power)**

Response 11: Ohio EPA appreciates the information regarding the water quality of Turkey Run, Stingy Run (tributaries to Kyger Creek) and groundwater in the area. When reviewing the data to determine the appropriate aquatic life use of Kyger Creek, Ohio EPA focused on the data collected in Kyger Creek.

The biological community scores indicate the water quality of Kyger Creek continues to improve since the 2008 survey. Surface water samples collected in 2015 and 2016 do not indicate that acid mine drainage is present in Kyger Creek in such amounts to impact aquatic life to the point of irretrievability. The LRW-AMD use designation is no longer applicable to Kyger Creek because it does not meet the criteria as specified in OAC 3745-1-07: <https://epa.ohio.gov/portals/35/rules/01-07.pdf>.

Comment 12: As Ohio EPA considers re-designating Southeast Ohio River tributaries, NPDES permit limits for Gavin Power must continue to be calculated using the promulgated, legally enforceable use designations currently set forth within the Ohio Administrative Code ("OAC").

The draft water quality study states that its findings may factor into regulatory actions. However, water quality standards and stream use designations are established through the rulemaking process. A final water quality study may be used to support a change in the law, but it simply does not have the force of law. Any permits in the areas of these Ohio River tributaries need to implement the current, legally enforceable water quality standards. (Gavin Power)

Response 12: Ohio EPA will adhere to the required statutory process for permit renewals and updating the water quality standards.

Comment 13: In addition to Gavin Power's three primary comments, there are several corrections or clarifications that should be reflected in subsequent drafts of the study:

- **Page 22 and subsequent references: Gavin Power, LLC acquired the General James M. Gavin Plant from AEP Generation Resources in January 2017 so all references to "Ohio Power Company" should be changed to "Gavin Power, LLC" and not "Ohio Power Company" unless referring to the previous owner during its ownership period.**
- **Figure 12 (page 27) shows selenium and mercury samples collected before the permitted outfalls**
 - **Table "d" - maximum concentration limit for mercury only applies to Outfall 008. Outfalls 007 and 009 did not have limits in place in 2015.**
 - **The information paragraph for Figure 12 currently states "data pooled for all for outfalls and flow" should be revised to state "data pooled for 3 outfalls and flow."**

- **Table 4 (page 37) should be removed or clarified because it infers that Gavin Power has exceeded permitted limits, which is not the case.**
 - **Table 4 applies the use designation being proposed by the draft water quality study. The heading of the Table, however, purports instead to show "Exceedances of Ohio WQS criteria (OAC 3745-1) ... " This Table does not demonstrate exceedances of OAC water quality criteria because the proposed designation is not in fact the legal requirement within the OAC.**
 - **Some of the selenium sample data included in this misleading table was not collected at the permitted outfall (008) and would not be used to determine compliance.**
- **Page 42 references to "Ohio Valley Electric Corporation Kyger Creek Station" should instead reference Gavin Power outfalls upstream of RM 4.0.**
- **Gavin Power does not operate multiple landfills; references on pages 18 and 22 should be changed when referring to the Residual Waste Landfill. (Gavin Power)**

Response 13: At the time of the survey (2015), Ohio Power Company owned the facility. However, Ohio EPA understands that the facility is now under the ownership of Gavin Power, LLC. Therefore, the BWQR has been revised to reflect "Gavin Power, LLC (formerly Ohio Power Company)".

Table 4 is a water quality criteria exceedance table and depicts water quality exceedances at specific stream sampling locations not violations of permit limits at permitted outfalls. The data in Table 4 is not used to determine permit compliance but is used to determine causes and sources of stream impairment. The water quality criteria for the exceedance table is always based on the recommended use designation.

Page 42 references have been revised.

Table 12 has been revised and combined with Figure 11.

Comment 14: The importance of these types of studies to verify existing aquatic life and recreation uses is reinforced by this report in the verification of default aquatic life uses previously assigned in 1978 and 1985. The report also adds verified uses to previously undesignated streams. Identification of the appropriate and attainable aquatic life use is essential to the balanced protection of water quality in Ohio. The number of verified and recommended uses also demonstrates that a comprehensive and watershed oriented baseline about water quality issues did not previously exist for a majority of these waters. (MBI)

Response 14: Ohio EPA concurs.

Comment 15: The information from this type of monitoring is essential for identifying the causes of aquatic life impairment with any semblance of scientific rigor. The identification of impaired waters in the U.S. triggers the development of TMDLs by States to deal with causes of impairment (aquatic life and recreational uses). The largest cost related to water quality issues are the remediation efforts that are driven by a TMDLs. Chasing

the wrong cause(s) of impairment because of inadequate monitoring data and designs represents a large cost to the citizens of Ohio and may overlook other problems that exist. The results of this survey design represent a cost-effective approach to the scientifically rigorous identification of water quality resource problems in Ohio watersheds and we fully support these types of data collection and analysis efforts. To be truly effective these types studies need to be scheduled on a sufficiently recurring basis to ensure restoration efforts are working and that rehabilitation dollars are wisely spent. Overall, this particular report exemplifies all of the excellent qualities that have become an expected output of the Ohio EPA surface water program and with some attention to our specific comments it could be improved even more. Please take our specific comments as constructive criticisms. (MBI)

Response 15: Thank you for your comment. Ohio EPA is working on developing a new Monitoring Strategy.

Comment 16: We again suggest that it would better serve the needs of interested parties to be able to download all of the pertinent data used in this study from the Ohio EPA web site including raw and summarized biological data, QHEI data, water column chemistry and sediment chemistry data, and continuous (DataSonde) data. While the TSD was accompanied by comprehensive appendices, it would be far more effective for a user to have the opportunity to perform electronic searches and conduct their own analyses if they so choose. We do appreciate past responses to this comment about the agency working to make this happen. (MBI)

Response 16: Thank you for your comment. Ohio EPA is continuing to work on providing this data to interested parties.

Comment 17: The Fact Sheet provided along with the draft report seemed to be less detailed than previous TSD fact sheets. We believe that it is important to explicitly state the three principal objectives of this type of assessment in each and every fact sheet:

1. Establish the attainable aquatic life use as codified in the Ohio WQS;
2. Determine the status of individual river and stream sampling locations in terms of attainment and non-attainment of the Ohio WQS; and,
3. Document any changes through time including a time series of changes in study areas with multiple years of assessment.

Doing this shows that the agency is still committed to properly executing the salient provisions of the Ohio WQS and communicating the effectiveness of their CWA programs that have positively affected the status of aquatic life uses over the past 40 years. Providing a summary of the beneficial use designation recommendations would be a helpful addition to the fact sheet although we recognize that this is also done at the time use changes are recommended. It would not hurt to include it in both.

We acknowledge that the Fact Sheet gets around to generally stating these objectives, but having a more explicit up front accounting of the above referenced overarching objectives would make it more apparent to the casual and less informed readers who

will not read the full report. The positives of the FS are that it provides a color coded map and a summary of all beneficial uses that apply to this study area. (MBI)

Response 17: Ohio EPA appreciates the constructive criticism on the Fact Sheet and will evaluate restructuring future Fact Sheets.

Comment 18: p. 1: The use of AMD as an acronym for alkaline mine drainage could be confusing. In our view AMD has been widely used as an acronym for acid mine drainage hence we are suggesting the acronym used herein be changed to perhaps “AkMD” so as to avoid the potential for confusion. (MBI)

Response 18: The BWQR has been revised to remove AMD as an acronym for alkaline mine drainage. Additionally, the BWQR has been clarified to present that non-acidic mine drainage is synonymous with alkaline mine drainage.

Comment 19: p. 3: The frequent use of maps and their quality is a positive aspect of the report. (MBI)

Response 19: Ohio EPA agrees.

Comment 20: p. 4: The statement about Little Kyger Creek being designated as LRW is insufficient when compared to the results displayed in Table 1. The fish are only 4 points shy of meeting WWH and the QHEI of nearly 70 does not reflect any serious habitat deficiencies that are generally common to LRW designated streams. Add to this that L. Kyger Creek receives NPDES permitted effluent (OVEC) including toxic metals (elevated levels of Se) and chlorides so how do we differentiate that from an “irretrievable” condition due presumably to AMD (acid mine drainage in this case) from abandoned mine lands (AMLs)? It is difficult to understand why instream Se exceedances were not measured given the effluent concentrations of Se discharged by OVEC and that significant exceedances were also observed in Kyger Creek downstream from the confluence with L. Kyger Creek. We also recognize that high Se occurs upstream in Kyger Creek as well, but that is also point source related issue (OVEC 008 outfall). We do not believe that a rationale for retaining the assignment of LRW to L. Kyger Creek can be supported given all of the information taken together. We do recognize the difficulties this could foster given the NPDES permit implications, but an active permit discharge cannot be part of the consideration of a UAA that results in a <CWA use like LRW (40 CFR Part 131). (MBI)

Response 20: The recommended aquatic life use in Little Kyger Creek is Modified Warmwater Habitat – Mine Affected. See the BWQR for more information.

Comment 21: p. 4: We are also concerned about the assignment of the MWH-MD use designation to the lower reaches of Kyger Creek. In the use attainment table on p. 8 we note that the fish assemblage is the contributing factor to what would constitute WWH non-attainment while the macroinvertebrates meet WWH. Given the presence of NPDES permitted sources on Kyger Creek, exceedances of toxic parameters including Se, elevated DELTs on fish (4%) in a watershed where all except one other site had any DELTs at all, a good QHEI score with modified:good attributes <2.0, this all seems to

warrant more analysis than has been provided to justify a less than CWA goal use. The “permanence” of the source of sediment was also not established and even if it is due to AMLs there are programs to reclaim such areas and abate the sedimentation that is purportedly causing WWH to be “unattainable”. We will also note that some Ohio streams that were designated LRW due to AML acid mine drainage have since been redesignated to WWH even though full attainment is unlikely for several decades. Clearly, the policy of assigning <CWA goals uses for AML impacts has changed since it was originally conceived when the restoration of AMLs seemed unlikely in the 1970s and 1980s. (MBI)

Response 21: See Response # 10 to Gavin Power's first comment on page 3.

Comment 22: p. 5: Under the Yellowbush Creek and Johns Run Status of Aquatic Life Uses in line 4 “course” should be “coarse”. It might be worthwhile to perform a search and replace across the document. (MBI)

Response 22: Revised. Thank you.

Comment 23: p. 5: Under the rationale for retaining the current and unverified EWH use designation for Forked Run the statement “In this regard, it is truly exceptional and the EWH use is therefore verified” is counter to the results. The fish do not come close to meeting the EWH biocriterion for the IBI and in fact are in nonsignificant departure from WWH. The rationale provided is that the stream is “oligotrophic” and apparently aesthetically noteworthy, but this alone is insufficient justification for retaining a use assigned in 1978 under a different and since abandoned approach and well before the system of biocriteria and systematic use attainability analysis (UAA) practice by Ohio EPA since the mid-1980s. The consequences of this could easily get out of hand when the next “nice” stream with a legacy EWH assignment from the 1978 or 1985 WQS is encountered. We strongly recommend that the use be changed to WWH which is clearly the appropriate and attainable use. The natural characteristics of these streams as is pointed out by the very comprehensive analysis of the landscape, habitat, and geomorphic properties of their watersheds are apparently not amenable to fostering the types of biota that result in EWH attainability.

Response 23: Noted. Forked Run is recommended WWH in the BWQR.

Comment 24: p. 8: Table 1 – please add a footnote or verbiage in the table legend to indicate what “(v)” is in each stream segment subheading. We assume it means that the current use was verified, but not all readers will understand this. (MBI)

Response 24: Revised. Thank you.

Comment 25: p. 8: In Table 1 under the column heading of Source(s), Coal Mining is listed several times. We believe that this is too generic and that it should be more detailed to differentiate AMLs from active mines, acidic drainage from non-acidic drainage, surface mines from underground mines, NPDES permitted vs. not permitted, etc. Maps later in the report do a good job differentiating each of these types of mines so that may need to be incorporated into more subcategories of Coal Mining. (MBI)

Response 25: The referenced table is a snapshot of potential causes of impairment. The maps and narrative discussion in other sections of the BWQR provide more information pertaining to the particulars of coal mining impacts.

Comment 26: p. 23: The effluent concentrations of several parameters (Figures 8-10) discharged from the OVEC 005 outfall have shown increases through 2015 (chlorides and manganese) or peak values during 2011-13 (arsenic, selenium). We would also suggest that for parameters that do not have NPDES limitations that an equivalent water quality based value be added so that a reader can make an informed judgement about the seriousness of these effluent values. We would think that given the low dilution available in L. Kyger Creek that Se would be an exceedance given the current WQ criterion of 5 µg/l and the number of instream exceedances shown later in the report. We will also note here that the most recent U.S. EPA criteria document (U.S. EPA 2016) for Se recommends a value of 3.1 µg/l. Once again, this all calls into question the basis for the current LRW use designation. (MBI)

Response 26: The graphs were designed to demonstrate the parameters monitored by the permittee as required by their issued NPDES permit and the relevant permit limits. However, Table 4 outlines water quality exceedances in Kyger Creek for selenium collected during the 2015 survey. Also, selenium was documented to be a significant stressor in Little Kyger Creek as shown in Figure 26 and Table 7. Ohio EPA evaluated the data based on the recommended ALU of MWH.

Comment 27: p. 26: The same concerns expressed above also exist for the Se effluent levels discharged by the Gavin outfalls (Figure 11). Can we also presume that the absence of Se values prior to 2014 is due to not monitoring for Se or are these <MDL levels. Without a corresponding clarification it appears that Se just suddenly appeared when we suspect that it was not being monitored. Either way this should be added to the figure and explained in the text while it appears that an indication of zero or <MDL levels is indicated on the effluent graphics for other NPDES regulated facilities. (MBI)

Response 27: Selenium was not monitored prior to 2014.

Comment 28: p. 32: It would help to better understand the flow hydrograph if lines representing the Q7,10, 80th%ile, median, and 10th%ile flows were added. (MBI)

Response 28: Ohio EPA has revised the hydrograph to display the historical median and believes the revised figure effectively demonstrates the hydrologic conditions during the sampling period.

Comment 29: p. 33: The legend for Figure 18 needs to indicate what the parameters are that are the basis of the ordination plot. (MBI)

Response 29: Inorganic surface water parameters from the 2015 survey were used as the basis of the ordination. This information has been added in the figure caption.

Comment 30: p. 34: For the chromium results presented in Figure 19 can we assume this is trivalent chromium? Given the presence of two major industrial sources was hexavalent chromium measured in the affected locations? (MBI)

Response 30: Ohio EPA sampled for total chromium.

Comment 31: p. 35: The analyses of chemical results that includes the influence of Level IV subregions and using the regional reference thresholds is impressive and robust analysis rarely duplicated by any other state or federal agency. (MBI)

Response 31: Thank you.

Comment 32: p. 37: The label of LWH for the use designation of L. Kyger Creek should be changed to LRW. The same goes for the footnote at the bottom of Table 4. (MBI)

Response 32: Revised. Thank you.

Comment 33: p. 41: In Table 5 some excursions of the minimum and average D.O. criteria are labeled as a “Negligible departure”. We are unsure about the judgement of any excursion of a criterion as “negligible” especially when such excursions are repeated at the same site and for the brief time window of the monitoring. We suggest that a word other than negligible be used otherwise this could create an impression that a series of negligible departures are somewhat tolerable when there is little to evidence or rationale to support such a conclusion. While the narrative discussion describes the excursions as resembling organic enrichment causes, there is no strong evidence provided for sources of organic enrichment. We would instead ask if this could be a chemical oxygen demand given the high levels of manganese, sulfates, and related parameters in these watersheds. We also note how in Figure 27 COD clustered with Mn, SO₄, and other parameters that could be related to excessive organic enrichment including TKN. We would also direct the report authors to look at Figure 6 in the 2011 Kyger Creek TSD. (MBI)

Response 33: The word “negligible” was used with precision in the given context. Automated data loggers compile D.O. values at hourly intervals over a 24-48-hour period with the intent of capturing the full daily range of concentrations, and as such, evaluating the resulting data against a water quality criterion needs to be done with more caution than evaluating a single daytime sample. Loggers were deployed at 16 sites in the study area yielding several hundred observations. Given that volume of data and given the fact that the full daily range of concentrations are captured, observing a handful of values between 3 and 4 mg/l is expected. It is also important to give context to the evaluation of data, as can be evidenced in contrast by Kingsbury Creek and the East Branch Little Hocking, where the sonde results indicated chronically low dissolved oxygen. Furthermore, the four locations where negligible departures were observed all had fully attaining biology, and in two of the four, the biology was excellent.

Comment 34: p. 45: Table 6 would be improved and made more user friendly if the Stream name was added alongside the Ohio river codes. (MBI)

Response 34: The table has been updated.

Comment 35: p. 50: Normally we would advise against correlating QHEI and IBI over such a small regional area instead favoring that it being done over at least a Level III ecoregion and possibly multiple ones in order to assure that a complete response gradient is captured and avoiding unintended “tunnel vision” and potentially erroneous conclusions drawn from such analyses. In this case, however, the gradient seems complete enough to support the conclusion that sulfate was a more important determinant of IBI than QHEI in the study area. This is also an elegant example about why Ohio EPA needs to maintain the spatial integrity of their M&A design. We are certain that had this been based on a spatially less intense synoptic or probabilistic design that the results and conclusions could have been different because critical pollution gradients in individual streams and subwatersheds that are non-random in the occurrence would have been missed altogether. (MBI)

Response 35: Thank you.

Comment 36: p. 53: In Table 8 it would be helpful if the significant P values were yellow highlighted. (MBI)

Response 36: The table has been sorted to have significant P-values at the top of the table.

Comment 37: p. 55: Table 8 is an informative compilation of the ordination results especially with respect to the marginality of WWH attainment along some of the axes. In the table legend the term “sampling error” is used to describe the nonsignificant departure for the IBI biocriterion. Since the ns departure is based on “normal” sampling variability, we do not believe it should be characterized as an “error”, but rather the operational variation expected with collecting biological data. (MBI)

Response 37: The table has been edited to correctly reflect non-significant departure of the IBI.

Comment 38: p. 57: The mapping of M&A results with the extent of surface mines both active and abandoned is an example of the excellent visual aids that are used throughout the report. (MBI)

Response 38: Ohio EPA agrees.

Comment 39: p. 58: Figure 30 is another good example of displaying a complex analysis that makes visual sense. We note that this analysis is limited to EPT taxa, which is understandable and commonly practiced. However, given the toxic parameters that have been identified we suggest that using the toxic tolerant groupings derived by Yoder and Rankin (1995) and the thresholds identified by Yoder and DeShon (2003) could reveal more information about key parameters such as Se. The more narrow *Cricotopus bicinctus* and *Polypedelim illinoense* species plus all of the other taxa identified as toxic tolerant should be similarly tested. This is based on work done by the agency in the late 1990s and early 2000s to be used as tools for evaluating such impacts and their sources.

We also note DELT anomalies of 4% in Kyger Creek at RM 1.0 downstream of the permitted industrial sources of Se and other metals. This is the highest DELT value ever recorded in the study area and only one other location had any DELTs detected at 1% in 2015 and only two detections of DELTs are recorded on the available historical data the highest being 1.6% in 1990. While the 4.0% value is not a high enough to define a toxic impact on its own (would need to be 10%), it is noteworthy that it occurred alongside elevated Se values which the agency has previously observed related to elevated DELTs in other parts of the state and we have recently seen the same in other states as well. In addition, the DELT value of 4% should have yielded an IBI metric score of 1 – it is given a metric score of 3 in the Appendices. When considering the low number of fish and the low MIwb score this is getting close to exhibiting a toxic response signature and we suspect the causal agent(s) could include Se. (MBI)

Response 39: Trends in Toxic Impact Response Signatures among macroinvertebrates have been evaluated and have been added to the macroinvertebrate appendix. There was an error with the appendices regarding low-end scoring, the appendix has been updated. The scores that were reported in Table 1 already reflected the low-end scoring of the IBI's from the samples collected from Kyger Creek RMs 1 and 4.

At the Kyger Creek RM 1.0 site, two of 48 fish had a DELT anomaly however there were no fish tissue samples collected in the basin. Both of the fish with DELTs were adult channel catfish with erosions. In Ohio EPA's experience, it is not uncommon to see channel catfish with erosions. There were elevated Se exceedances in the chemistry samples collected in Kyger Creek below the permitted industrial source.

Comment 40: p. 66: The analyses in Figure 33 is yet another of many examples in this TSD reflecting the benefits of a sustained M&A program at this level of spatial resolution. (MBI)

Response 40: Ohio EPA agrees.

Comment 41: p. 70: The Recreation assessment beginning on p. 70 seems to have been based on the pre-2016 E. coli criterion rule change that is an example of a retreat from what was otherwise a tiered system based on the relative risk of human contact with a waterbody. In our view the adoption of what now amounts to a one-size-fits-all E. coli criterion in late 2016 negates this analysis. We had the same experience in Hamilton Co. where four years of reasonable assessment of recreational risk was similarly negated. As a result, we are not surprised by the consistent non-attainment of PCR that was observed and this is an almost expected result in other streams across the state even at reference sites. Part of this is the fault of E. coli being too prone to false positives and thus delineating highly questionable impairments. Until better E. coli criteria are developed or a better bacterial indicator is developed the agency will be "chasing" recreational impairments that have little or no real risk to human contact uses. We do agree that extremely high E. coli values should be addressed, but these are at levels well in excess of what now triggers a recreational impairment. (MBI)

Response 41: The recreation assessments are made based upon a comparison to the applicable water quality criteria. The current criteria were adopted by Ohio EPA in 2015 to be consistent

with federal criteria recommendations published by USEPA in 2012. USEPA's 2012 criteria recommendations no longer supported the concept of recreation use subcategories and associated bacteria criteria that were contained in Ohio's water quality standards for about six years prior to adoption of the new recreation criteria in 2015. It should be noted that the federal criteria recommendations, and by extension, Ohio's current recreational criteria, represent the state of the science based upon numerous workshops and studies convened by USEPA in preparing the 2012 federal recommendations. In 2017, USEPA published its five-year review of the 2012 criteria as required by the federal BEACH Act and concluded that no revisions to the 2012 criteria were necessary at the time. However, USEPA noted that additional research and analysis as identified in the five-year review report will contribute to their future reviews of the criteria. Should a future review be found to necessitate an update to the federal criteria, Ohio, like other states, would then potentially need to update their recreational criteria. Additional information concerning the recreational criteria can be found at USEPA's web page at: <https://www.epa.gov/wqc/2012-recreational-water-quality-criteria>.

Comment 42: p. 77: Other than the map of spills in Figure 37 and the overlay with NPDES discharges, was there any attempt to correlate spills with biological condition and responses? (MBI)

Response 42: No. The inclusion of spills in the BWQR was for the purpose of demonstrating industrial activity within the study area, not for determining biological impairment.

Comment 43: p. 89: In Figures 39 and 40 what appear to be missing values should be denoted as such otherwise these could be interpreted as zero values. The discussion should also state whether fish tissue was tested for Se given the very high levels found in Kyger and L. Kyger Creeks. (MBI)

Response 43: Tissue samples with a non-detect for a parameter were plotted as half the method detection limit and are visible on the chart. Any missing value indicates that that fish species was not collected in the given year.

Additional Comments from Gavin Power LLC dated May 28, 2019

Comment 44: Why is only one year of data used to make aquatic life use designation changes? One year of data is inadequate, especially in this watershed where significant historical mining impacts are well-documented and the change would be an abrupt departure from OEPA's past determinations. Does the OEPA have estimates of interannual variability in relevant reference sites? How does the inter-annual variability of OEPA's biological endpoints and criteria factor into the agency's decision-making?

Response 44: Measurement of the biological communities provide a summation of all the physical and chemical influences to which they are exposed. As stated in Volume I of the Biological Criteria Manual, "The condition of the resident biological communities is the result of the recent and past conditions including both usual and extreme events" (page 4, Volume I <https://epa.ohio.gov/Portals/35/documents/Vol1.pdf>). Thus, a biological assessment provides a direct read on the status of the stream conditions because they

integrate and react to any stressors present, whether or not they are independently measured.

The recommended aquatic life use was not made based on one year's worth of data; rather, it is based on the trajectory observed over several years. The question of variability at reference sites is irrelevant to given situation. IBI scores from common sites in Kyger Creek and Little Kyger Creek all improved, and improved by an average of 16 points. That's well outside the range of expected variability at any site. Furthermore, the probability of observing a common directional change (in this case toward improvement) at 5 sites is 0.03125.

Comment 45: Did the OEPA observe widespread increases in biological condition throughout the SEORT study area, or just in some of the waterbodies? Widespread increases in biological condition may indicate regional factors, (e.g. weather variation causing variation in hydrology or water temperature) that may change from year to year.

Response 45: General trends are improving in the SEORT study area. Campaign Creek, Indian Guyan Creek, Leading Creek, Shade River and Raccoon Creek have all showed improvement often due to reclamation and abatement of mine drainage. Collection of the biological data follows standardized field sampling methods located in Volume III of the Biological Criteria Manual: https://epa.ohio.gov/Portals/35/documents/BioCrit15_Vol3.pdf.

Kyger Creek was surveyed in 1982, 1990, 2008 and 2015. The average fish community scores (IBI) were poor from 1982 to 2008 but improved to fair in 2015. The average macroinvertebrate community scores (ICI) were poor in 1982, fair in 1990 and 2008 and improved to good in 2015. The overall trend suggests that the water quality has significantly improved and is capable of supporting a MWH community and could possibly support a WWH community if water quality continues to improve.

Table 1. Kyger Creek biological trends. Orange is poor, yellow is fair and green is good.

Metric	1982	1990	2008	2015
IBI	18	17	23.2	36.8
ICI	17	19.5	27	40

Comment 46: Gavin would like to better understand the OEPA's evidence of exposure pathways and the temporal cooccurrence of improving physical and chemical factors associated with the biology. What physical and chemical factors does the OEPA believe are proximate causes of improved biological condition in Kyger Creek? Figure 35 in the 2015 Study (OEPA 2019) indicates that the mining-related water quality parameters are of similar concentrations between 2008 and 2015 in the lower section of Kyger Creek. The report states that excessive sediment continues to limit the biological potential in Kyger Creek. What physical and chemical factors does the OEPA believe have improved to cause the increased biological scores? Understanding why this potential

improvement is occurring is important to knowing whether the data measures a true improvement or instead reflects an unexplained and perhaps temporary deviation.

Response 46: Ohio EPA data demonstrated that pH in Kyger and Little Kyger improved to neutral and was therefore likely no longer a limiting factor, and likely the reason for observed improvements in the fish and macroinvertebrates.

Comment 47: The OEPA stated that the macroinvertebrate community was supporting a warmwater habitat (WWH) use based of the 2015 ICI results. However, EPT richness was below the WWH threshold at Kyger Creek (RM 1 and 4). Please explain why the EPT results do not factor into your conclusion of aquatic life use support. The EPT richness metric was displayed in the 2015 Study (OEPA 2019) and OEPA’s May 14 presentation, suggesting that this metric is a relevant indicator.

Response 47: The Kyger Creek site at RM 8.42 had 14 qualitative EPT taxa, was assessed as “Good” and met the WWH biological performance expectations. The number of qualitative EPT taxa (and the total EPT) downstream at RM 4.0 had decreased downstream of the point source discharge. These results demonstrated that the macroinvertebrate community was impacted in some capacity from the discharge source to Kyger Creek. However, the total number of qualitative EPT taxa was still in the “marginally good” range. Marginally good is defined as just below WWH expectations but still meets expectations (Biological Criteria for the Protection of Aquatic Life manual, Volume III).

This is a nonsignificant departure from WWH – MG^{ns}. The Volume III Qualitative EPT plot (Figure 4) displays a quadrisectioned line separating the Fair expectation section. There is a marginally good component just below the line that is nonsignificant decrease below the WWH expectation line. The narrative rating of “Very Good” is a nonsignificant departure from the Exceptional narrative.

During the data analysis of a qualitative assessment, EPT taxa is not the only criteria analyzed. Total taxa and predominant organisms are among other criteria reviewed.

The lower two sites had drainage areas over 20 square miles and artificial substrate samplers were deployed for quantitative assessments. At Kyger Creek’s RM 4.0 site, the quantitative samplers were collected, and the ICI scored a 46 (exceptional performance) with a total of 12 EPT taxa collected. The ICI of 46 meets the biocriteria for EWH performance.

Comment 48: *Gavin would like to make a correction to Comment 1 provided in its letter dated April 1, 2019 regarding OEPA’s Draft February 2019 Biological and Water Quality Study of Selected Southeastern Ohio River Tributaries, 2015.*

Gavin agrees that the 2015 fish and macroinvertebrate survey data do provide an indication that a modified warmwater habitat (MWH) aquatic life use may be supported; however, it is undisputed that the stream is not in full attainment of MWH. The OEPA 2015 biological study states that Kyger Creek only met 5 of the 6 criteria for full attainment of MWH designation, this point was then reaffirmed at the May 14th meeting in Groveport, Ohio. It is premature to use one season of limited

2015 sampling data to support a change in the stream use designation when there is no obligation to do so at this time. Gavin agrees that the warmwater habitat (WWH) aquatic life use is not supported.

Response 48: Please see the response to Comment 10 above.

Comment 49: *Gavin Power has made a formal request to the OEPA for the original UAA report (circa 1982) that was the basis for the LRW designation in Kyger Creek.*

Frost Brown Todd made this request on behalf of Gavin on May 16th, 2019. This would provide a comparative basis to determine if the legacy acid mine drainage impacts have been remediated or are still present in the watershed. The OEPA has made a prior determination that the waterbody is a LRW based on its own criteria and information. Altering this finding must be based on a comparative evaluation of what has changed.

Response 49: We have provided the requested document. While this document provides some historic context, the contemporary data are the basis for the aquatic life habitat recommendations made in the biological and water quality report. We do note however that in the table of pH values from Kyger Creek in the 1983 report (reproduced below) that 29 of the 30 values were less than 5.0 standard units with half the 30 values at 4.1 standard units or less. Not a single value of the 30 pH values from the report were in the pH range of 6.5-9.0 standard units, which is the pH criterion consistent with the WWH and MWH designations in the water quality standards. Please note that nothing in the Clean Water Act requires a comparative analysis to designate a water body.

<u>Date</u>	<u>pH</u>	<u>Date</u>	<u>pH</u>
7/02/71	3.28	10/20/72	4.50
8/03/71	3.30	1/17/73	4.28
9/01/71	3.45	2/14/73	4.38
10/06/71	3.75	3/14/73	4.70
11/03/71	3.78	4/23/73	5.81
1/04/72	4.63	5/16/73	4.3
3/08/72	4.45	6/24/73	4.55
4/05/72	4.38	7/12/73	4.5
5/04/72	4.08	8/73	3.3
6/09/72	3.71	7/18/73	3.0
7/10/72	3.50	10/73	3.7
8/07/72	3.45	11/26/73	4.0
9/06/72	4.12	1/22/74	4.6
10/05/72	3.68	4/16/74	4.5
11/16/72	4.42	7/10/74	4.4

Comment 50: *The OEPA asserts on page 67 of the 2015 Study (OEPA 2019) report that “Acid mine drainage does not appear to be an underlying source of impairment as pH was normal (mean = 7.4 in 2015).” Statements made by OEPA during the May 14 meeting suggested that the overall area was seeing improvement and that Kyger Creek was following suit. Does the OEPA believe that acid mine drainage impacts in the watershed have been restored? If so, to what does OEPA attribute that restoration?*

Gavin Power has a series of Residual Waste Landfill (RWL) leachate/sedimentation ponds and a Fly Ash Reservoir (FAR) that discharge to Turkey Run Creek and Stingy Run Creeks, tributaries of Kyger Creek. The RWL ponds and the FAR discharge to NPDES outfalls 001, 007 and 009. There is strong evidence that the effects of legacy mining in Gallia County are still present in the Kyger Creek watershed (see attachment A). The OEPA 2008 Study (OEPA 2011) states that evidence of acid mine drainage is present and further remediation is needed. The 2016 ODNR Mine Drainage Impact Assessment of Ohio Watersheds (ODNR 2016) indicates that no reclamation work has been performed in this area (see attachment B).

Under Gavin's current NPDES permit (0IB00006*OD), outfalls are regulated by the OEPA to maintain a pH value between 6 to 9 at 001 and 007 and 6.5 to 9 at 009. Gavin maintains these pH levels by the addition of caustic soda at Outfalls 007 and 009. Currently at Outfall 001, a passive means of pH control is used (limestone lined ditches and ponds) along with caustic soda. At the time of the OEPA's 2015 Study (OEPA 2019), Gavin was adding 400 GPD of caustic soda to maintain pH at the outfalls. Gavin's outfalls impact the pH of these streams by increasing the low pH waters upstream of the plant's outfall and overall increasing the buffering capacity of Kyger Creek further downstream. pH readings were taken in several locations upstream of Outfall 007 (Turkey Run) and Outfall 001 and Outfall 009 (Stingy Run) in March and May 2019 with pH values ranging from 3 to (see attachments C and D).

Response 50: The biological analysis demonstrates water quality improvement. Based on the data, it does not appear that acid mine drainage is a source of impairment in Kyger Creek. Ohio EPA does state in the draft BWQR that Kyger Creek does appear to be impaired by non-acidic mine drainage and sedimentation. Therefore, Ohio EPA does believe the watershed condition to be improved but notes it is still impaired by other factors.

Comment 51: *Gavin asserts that two days of pH monitoring during the low-flow period is not adequate to conclude that intermittently acidic conditions, associated with acid mine drainage [per OAC 3745-1-07(b)(1)(g)], is not occurring and would not have an impact on the biological scores.*

During the low-flow conditions when the pH was characterized by the OEPA in its 2015 Study (OEPA 2019), the buffering capacity afforded by Gavin's treated effluent is likely to be greater than during high flow events. The discharge rates from Outfalls 007 and 009 into Turkey Run and Stingy Run are consistent over time with stormwater as an influence, and therefore would be a greater proportion of overall Kyger Creek flow during low-flow conditions. Outfalls 007 and 009 treat stormwater and leachate from the RWL. Outfall 008 would have a similar effect on Kyger Creek. Outfall 001 is not a continuous or constant flow. Stingy Run along with other small tributaries flow into the FAR, combine and discharge through Outfall 001. Under the current NPDES permit, Outfall 001 has limits for pH and suspended solids. Gavin maintains a certain water level in the reservoir to aid in the reduction of suspended solids and for pH neutralization. During the 2015 biological study, pH neutralization was performed by caustic soda additions at two locations in the FAR system. Discharge from the FAR is then metered in through a spill to maintain a certain level in the reservoir. This

operation has been in place since 2012. In sum, it is likely that 1) pH during the low-flow conditions are moderated by the treated effluent of Gavin outfalls, and 2) pH is less buffered during high flow conditions, because the treated effluent would be a smaller proportion of flow and therefore less buffering capacity.

Response 51: The biological community would reflect continuous or intermittent acidic conditions. The biological data from Kyger Creek is not supportive of the LRW aquatic life use nor acidic conditions. Ohio EPA has pH data from the Kyger Creek RM 4.0 sampling location from 17 sampling events ranging from April 2015 to February 2016. Additionally, pH data was collected at the RM 1.0 location during five sampling events ranging from June to September of 2015. None of the collected pH data supports that Kyger Creek is impaired by intermittently acidic conditions.

Comment 52: *Gavin requests that before the OEPA continue its biological assessment of Kyger Creek an additional biological survey be completed after the closure of Gavin's FAR. This time frame meets with the testing cycle stated in the comment meeting of 5 to 7 years.*

Gavin Power ceased fly ash sluicing to the FAR in December 1994. The actual closure of the FAR started in 2012 by lowering the water level in the reservoir and reclamation work started in 2015. The FAR closure consists of lining the fly ash with a HPDE liner, capping with clay and then applying a grass cover. Final closure is required by June 2020 although Gavin may request an extension due to weather delays that have impacted the safe completion of some work in 2018 (see attachment E).

The FAR receives nearly 950 acres of stormwater runoff, Stingy Run and other small streams from the surrounding area (see attachment F). As stated in Comments #3 and #4, waters that currently flow to the FAR are impacted by the legacy mining in Gallia County. The FAR historically has been used as a sedimentation pond offering neutralization and flow control, which will be lost once the FAR dam and spillway are removed.

The totality of impacts that closure of Gavin's FAR will have on the biological health of Stingy Run and Kyger Creek is unclear, but it is certain that water flow, pH and sediment loading to Stingy Run and Kyger Creek will be impacted after 2021. It is premature to re-designate Kyger Creek as MWH-MA before the actual state of the Kyger Creek is evaluated after the FAR closure. No other construction or reclamation projects in the watershed area would have as a significant impact as the FAR on Kyger Creek. Gavin Power suggests additional biological studies after 2021 to accurately apply a water quality designation to Kyger Creek.

Response 52: Under the Clean Water Act, beneficial use recommendations are based on the biological potential of the streams to support a biological community. The data collected in 2015 demonstrates that Kyger Creek has the potential to support a MWH community and could potentially support a WWH community if water quality continues to improve.

End Response to Comments