# Revision to Upper Guyandotte TMDL Project

# Rationale Document

# January 8, 2021

Upon receiving comments for the Upper Guyandotte River Watershed TMDL project, released for public review on June 18, 2020, WVDEP re-evaluated the trout designations for streams in the Upper Guyandotte River watershed, particularly where regular stocking occurs in streams heavily influenced by active mining pump discharges. One comment petitioned the WVDEP to assign total iron operable allocations protective of warm water fisheries of 1.5 mg/l for any permits that predate trout designations.

Given the implications of stream classification to permitted stakeholders, WVDEP has conducted an additional assessment of the streams identified as trout in Upper Guyandotte to assure the appropriate protections are prescribed in TMDL wasteload allocations (WLAs). WVDEP analyzed three factors when considering the commenters’ request regarding WLAs for permitted discharges predating trout designation:

1. trout study documentation and timing of designation relative to the issuance of permits,
2. whether the TMDL required reductions of existing permit limits to an operable allocation of 1.0 mg/L total iron, protective of trout, and
3. the likelihood that a stream could naturally support trout in the absence of active pumped deep mine discharges and should be considered a trout stream.

When there was evidence that a trout designation in a stream had existed for a time during which permits were issued to protect trout designated use, no changes were considered to the TMDLs for that stream. Effluent limits protective of trout, clearly derived from the total iron 4-day average of 1.0 mg/l, occur in the majority of designated trout streams in the Upper Guyandotte Watershed. The exceptions were in Gooney Otter Creek, Barkers Creek, and Buffalo Creek watersheds.

Active mine permits in the Gooney Otter Creek and Barkers Creek watersheds had been permitted at technology-based limits prior to this TMDL. While some were reduced to 1.5 mg/l in the allocated condition, no permitted discharges in these two watersheds were reduced to an operable WLAs of 1.0 mg/l.

Although there were total iron antidegradation limits for mining outlets in the Buffalo Creek watershed, which will not be relaxed by the less stringent WLAs presented in this TMDL (see section 7.7.1); Buffalo Creek is the only stream identified in this TMDL as trout in which there were **no** existing permit limits clearly derived from the total iron 4-day average of 1.0 mg/l in the baseline condition, and in which there **were** prescribed reductions to an operable WLA of 1.0 mg/l in a portion of the permitted discharges.

The third factor considered in response to the commenters request is: the likelihood that a stream could naturally support trout in the absence of active pumped deep mine discharges and should be considered a trout stream. An examination of this factor is based on the USEPA Water Quality Standards Handbook, which provides an applicable scenario when discussing existing uses for aquatic life in Section 4.4.2. (USEPA, 2012):

*Section 131.12(a)(1) states, "Existing instream water uses and level of water quality necessary to protect the existing uses shall be maintained and protected. "For example, while sustaining a small coldwater fish population, a stream does not support an existing use of a "coldwater fishery. "The existing stream temperatures are unsuitable for a thriving coldwater fishery. The small marginal population is an artifact and should not be employed to mandate a more stringent use (true coldwater fishery) where natural conditions are not suitable for that use.*

*A use attainability analysis or other scientific assessment should be used to determine whether the aquatic life population is in fact an artifact or is a stable population requiring water quality protection. Where species appear in areas not normally expected, some adaptation may have occurred and site-specific criteria may be appropriately developed. Should the coldwater fish population consist of a threatened or endangered species, it may require protection under the Endangered Species Act. Otherwise, the stream need only be protected as a warm water fishery.*

Whereas WVDEP recognizes that Buffalo Creek functions as a stocked trout fishery, supported in part by coal industry partners, additional assessment is needed to determine whether the trout population is stable and could be sustained naturally in the absence of active pumped deep mine discharges. Commenters are correct that the most difficult challenge when making a trout status call is determining whether a stream can sustain a year-round population, particularly when the stream is actively stocked.

To answer these questions, WVDEP considered existing instream temperature data and the influence of deep mine discharges on the stream flow and temperature. While the trout definition is not temperature dependent and rainbow and brown trout are more tolerant of temperature than native brook trout, all trout generally require colder water.

WVDEP has monitored several stations on Buffalo Creek and collected water temperature, flow, and other water chemistry parameters. When examining the temperature, WVDEP found that in more cases than not, the water temperature surpasses that described in 47CSR2- Section 8.29.2 as a cold water hourly maximum temperature (Table 1), with higher temperatures occurring occasionally at stations along the entire reach and in months from March to November. In addition, Buffalo Creek is unique from other trout streams in Upper Guyandotte because its watershed is relatively lower in elevation than all other trout streams in Upper Guyandotte. For comparison, the elevation of Buffalo Creek near the mouth is 500 feet lower in elevation than the mouth of Pinnacle Creek (a similarly sized stream). Typically, higher elevations result in decreased stream temperatures. Given the higher temperatures in Buffalo Creek, more data is needed to determine if the stream or some stream reaches can sustain a year-round trout population, particularly without active deep mine discharges. WVDEP also examined the flow reported for deep mine discharges in the Buffalo Creek watershed and found that discharges likely influence the flow and temperature during low flow critical conditions in the stream. The degree of that influence, particularly in reaches and pools that harbor stocked trout, requires additional study.

**Table 1: Monitored temperature at Buffalo Creek monitoring stations compared to hourly maximum temperatures expressed in 47CSR2 Section 8.29.2 when describing cold waters.**

| **STREAM**  | **ANCODE** | **Mile****Point** | **DATE** | **FLOW****(cfs)** | **Temp (C)** | **Temp (F)** | **WQS****Hourly** **Max** | **Monitored >** **WQS Max** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Buffalo Creek | WVOG-75 | 0.2 | 8/23/2000 |  | 20.05 | 68.09 | 70 | FALSE |
| Buffalo Creek | WVOG-75 | 0.2 | 9/14/2005 |  | 19.87 | 67.766 | 62 | TRUE |
| Buffalo Creek | WVOG-75 | 0.2 | 6/15/2015 | 21.3 | 27.11 | 80.798 | 70 | TRUE |
| Buffalo Creek | WVOG-75 | 0.2 | 8/12/2015 |  | 20.37 | 68.666 | 70 | FALSE |
| Buffalo Creek | WVOG-75 | 0.2 | 9/30/2015 | 12.62 | 20 | 68 | 62 | TRUE |
| Buffalo Creek | WVOG-75 | 0.2 | 11/4/2015 | 9.733 | 17.86 | 64.148 | 55 | TRUE |
| Buffalo Creek | WVOG-75 | 0.2 | 12/15/2015 | 15.37 | 11.63 | 52.934 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 0.2 | 1/18/2016 | 31.68 | 0.58 | 33.044 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 0.2 | 2/16/2016 |  |  | 32 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 0.2 | 2/16/2016 | 149.6 | 4.4 | 39.92 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 0.2 | 3/15/2016 | 68.17 | 14.7 | 58.46 | 55 | TRUE |
| Buffalo Creek | WVOG-75 | 0.2 | 4/12/2016 | 32.03 | 17 | 62.6 | 55 | TRUE |
| Buffalo Creek | WVOG-75 | 0.2 | 5/3/2016 |  | 13.3 | 55.94 | 62 | FALSE |
| Buffalo Creek | WVOG-75 | 0.2 | 6/6/2016 | 45.08 | 21.9 | 71.42 | 70 | TRUE |
| Buffalo Creek | WVOG-75 | 0.2 | 7/4/2018 |  | 25.78 | 78.404 | 70 | TRUE |
| Buffalo Creek | WVOG-75 | 2 | 10/2/2018 |  | 18.9 | 66.02 | 55 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 8/28/2000 |  | 23 | 73.4 | 70 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 9/13/2005 |  | 22.62 | 72.716 | 62 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 9/13/2005 |  |  | 32 | 62 | FALSE |
| Buffalo Creek | WVOG-75 | 9.9 | 6/16/2015 |  | 23.05 | 73.49 | 70 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 8/12/2015 |  | 22.5 | 72.5 | 70 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 9/30/2015 |  | 18.87 | 65.966 | 62 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 11/17/2015 |  | 10.32 | 50.576 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 9.9 | 12/15/2015 |  | 12.28 | 54.104 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 9.9 | 1/19/2016 |  | 0.56 | 33.008 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 9.9 | 2/15/2016 |  | 3.6 | 38.48 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 9.9 | 3/14/2016 |  | 15.5 | 59.9 | 55 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 4/11/2016 |  | 15.9 | 60.62 | 55 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 5/2/2016 |  | 14.5 | 58.1 | 62 | FALSE |
| Buffalo Creek | WVOG-75 | 9.9 | 5/31/2016 |  | 19.4 | 66.92 | 62 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 6/19/2018 |  | 25.96 | 78.728 | 70 | TRUE |
| Buffalo Creek | WVOG-75 | 9.9 | 10/1/2018 |  | 19.4 | 66.92 | 55 | TRUE |
| Buffalo Creek | WVOG-75 | 14.1 | 10/2/2018 |  | 17.4 | 63.32 | 55 | TRUE |
| Buffalo Creek | WVOG-75 | 15.35 | 8/11/2015 |  | 19.67 | 67.406 | 70 | FALSE |
| Buffalo Creek | WVOG-75 | 15.35 | 9/30/2015 |  | 18.07 | 64.526 | 62 | TRUE |
| Buffalo Creek | WVOG-75 | 15.35 | 11/17/2015 |  | 9.93 | 49.874 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 15.35 | 12/16/2015 |  | 7.56 | 45.608 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 15.35 | 1/20/2016 |  | 0.22 | 32.396 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 15.35 | 2/15/2016 |  | 3.5 | 38.3 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 15.35 | 3/14/2016 |  | 14.8 | 58.64 | 55 | TRUE |
| Buffalo Creek | WVOG-75 | 15.35 | 4/12/2016 |  | 10.2 | 50.36 | 55 | FALSE |
| Buffalo Creek | WVOG-75 | 15.35 | 5/2/2016 |  | 14.4 | 57.92 | 62 | FALSE |
| Buffalo Creek | WVOG-75 | 15.35 | 5/31/2016 |  | 19.6 | 67.28 | 62 | TRUE |
| Buffalo Creek | WVOG-75 | 15.35 | 6/19/2018 |  | 22.53 | 72.554 | 70 | TRUE |
| Buffalo Creek | WVOG-75 | 15.4 | 6/23/2015 |  | 19.92 | 67.856 | 70 | FALSE |
| Buffalo Creek | WVOG-75 | 17.4 | 8/30/2000 |  | 17.66 | 63.788 | 70 | FALSE |

In light of this initial assessment and additional data needs to resolve a trout classification, WVDEP has determined that prescribing reductions to pre-existing permits through WLAs protective of a trout water designation in Buffalo Creek Watershed are inappropriate at this time. WLAs originally reduced to a total iron operable allocation of 1.0 mg/l were recalculated at 1.5 mg/l. The increased loads resulting from this change were added to total iron TMDLs in Buffalo Creek (WVCode: WVOG-75, NHD Code: WV-OGU-27), Toney Fork (WVCode: WVOG-75-J, NHD Code: WV-OGU-27-U), Elklick Branch (WVCode: WVOG-75-K, NHD Code: WV-OGU-27-W), and the Upper Guyandotte River below RD Bailey Lake (WVCode: WVOG, NHD Code WV-OGU). These changes will be reflected in **Table 8-1** of the final draft public report and are highlighted in the *revised* total iron allocation sheets accompanying this rationale. Load allocations and future growth were not altered in the Buffalo Creek Watershed and remain protective of a total iron 1.0 mg/l, providing an additional implicit margin of safety in Buffalo Creek and the Upper Guyandotte River.

**Reference:**

USEPA (United States Environmental Protection Agency). 2012. Water Quality Standards Handbook, Office of Water, EPA-823-B-12-002. Accessed web address October 2020, <https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter4.pdf>.