Aluminum TMDL Addendum for Selected Streams in the Coal River Watershed, West Virginia

Final Approved Report

September 2006

COAL RIVER WATERSHED DISSOLVED ALUMINUM TMDL ADDENDUM

TMDLs Based Upon the Revised Warmwater Aquatic Life Criterion

On January 9, 2006, EPA approved a revision to West Virginia's water quality standard regulations relative to numeric water quality criteria for aluminum. The approved revision temporarily modifies the chronic, aquatic life protection, dissolved aluminum criterion for warmwater fisheries. During an interim period from the date of approval until July 4, 2007, the criterion value that is effective for Clean Water Act purposes is 750 micrograms per liter (µg/L). The previously effective value was 87 µg/L. If no further legislative action is taken, the 87 µg/L criterion will again become applicable. It is important to note that the approved revision does not change dissolved aluminum water quality criteria for troutwaters.

TMDLs must be based upon the effective water quality standards at the time of development. Throughout this TMDL development process, which began in January 2002, the impairment status of waters and the calculation of aluminum TMDLs and allocations were based upon the previously effective, 87 µg/L criterion. When the TMDLs were nearing completion, DEP learned of EPA's impending approval of the water quality standard revision and suspended development activities. DEP has now reevaluated the impairment status of warmwater fisheries pursuant to the 750 µg/L criterion and recalculated TMDLs and allocations for impaired waters. The recalculated TMDLs and allocations for the entire watershed are contained in this addendum.

Because of the temporary nature of the criterion value, the draft aluminum TMDLs for warmwater fisheries that were based upon the 87 µg/L criterion remain a component of the Coal River watershed TMDL, to be implemented only if the criterion becomes effective in the future. All displays of aluminum impairments contained in the previously advertised documents (Coal River Watershed TMDL Report, Coal River Watershed Appendix reports and allocation spreadsheets) relate to the 87 µg/L criterion. The ArcExplorer Project has been supplemented with new information for TMDLs based upon the 750 µg/L criterion.

Table 1 lists the impaired streams based on the previous and current dissolved aluminum criteria.

Table 1. Aluminum Impaired Streams in Coal River watershed

Subwatershed	Stream Code	Stream Name	Impaired Per Previously Effective Chronic Warmwater Dissolved Aluminum Criterion = 87 µg/L	Impaired Per Currently Effective Chronic Warmwater Dissolved Aluminum Criterion = 750 µg/L
Marsh Fork	WVKC-46-A	Little Marsh Fork	X	
	WVKC-46-A-4	Brushy Fork	X	
	WVKC-46-G-2	Martin Fork	X	X
	WVKC-46-J-2	Bee Branch	X	X
	WVKC-46-Q	Millers Camp Branch	X	
Clear Fork	WVKC-47	Clear Fork (below Dorothy)	X	
	WVKC-47	Clear Fork (above Dorothy)	X	See note below
	WVKC-47-F	Stonecoal Branch	X	X
	WVKC-47-G	Long Branch	X	
	WVKC-47-G-1	Dow Fork	X	X
Pond Fork	WVKC-10-U	Pond Fork	X	
	WVKC-10-U-3	Robinson Creek	X	
	WVKC-10-U-7	West Fork	X	
Spruce Fork	WVKC-10-T	Spruce Fork	X	
	WVKC-10-T-5	Hunters Branch	X	X
	WVKC-10-T-9	Hewett Creek	X	
	WVKC-10-T-11	Spruce Laurel Fork	X	
Coal River	WVKC-10-H	Little Hewitt Creek	X	
	WVKC-31	Laurel Creek	X	
	WVKC-31-C	Cold Fork	X	X
	WVKC-32	Horse Branch	X	X
	WVKC-33	Haggle Branch	X	X
	WVKC-35	White Oak Creek	X	
	WVKC-35.8	UNT/Coal River RM 52.7	X	X
	WVKC-35-D	Threemile Branch	X	X
	WVKC-35-E	Left Fork/White Oak Creek	X	
	WVKC-39	Little Elk Creek	X	

Note: Clear Fork (above Dorothy) is a troutwater, therefore the approved chronic warmwater dissolved aluminum criteria revision does not apply

Table 1 demonstrates that many of the waters that were identified as dissolved aluminum-impaired pursuant to the 87 µg/L chronic criterion are not impaired pursuant to the 750 µg/L criterion. Dissolved aluminum TMDLs are presented in this addendum only for waters that are impaired pursuant to the currently effective criteria. Additionally, the calculated values for load allocations, wasteload allocations and TMDLs have been revised as necessary to achieve those criteria.

As discussed in the TMDL and Technical Reports, dissolved aluminum TMDL scenarios were developed by comparing DESC-R output directly to the TMDL endpoint. If the predicted dissolved aluminum concentrations exceeded the TMDL endpoint, the total aluminum sources represented in MDAS were reduced. To account for the revised warmwater aquatic life criterion, TMDL scenarios were evaluated by selecting the dissolved aluminum TMDL endpoint for the acute criterion for aquatic life (712.5 micrograms per liter (µg/L); based on the 750 µg/L acute criterion for aquatic life minus a 5 percent MOS).

Clear Fork above Dorothy is classified as a trout water and therefore, TMDL allocations were developed based on an endpoint of 82.7 µg/L (based on the 87 µg/L chronic criterion for trout waters minus a 5 percent MOS). Upstream tributaries in the Clear Fork watershed (including Stonecoal Branch and Dow Fork) were evaluated pursuant to the warmwater criterion based on the top-down methodology described in Section 7.5.1 of the TMDL Report. The TMDL presented for Clear Fork above Dorothy represents the trout water segment of the mainstem.

The revised dissolved aluminum TMDLs are shown in Table 2. The TMDLs are based on a dissolved aluminum TMDL endpoint; however, sources are represented in terms of total aluminum and therefore are presented in the form of total aluminum. Detailed source allocations (load and wasteload allocations) associated with these revised aluminum TMDLs can be found in the allocation spreadsheet called "Coal River Dissolved Aluminum Addendum TMDL_Allocations_12_15_06.xls". The TMDLs shown in Table 2 and the source allocations in the subject spreadsheet are to be implemented pursuant to currently effective criteria.

Table 2. Aluminum TMDLs for the Coal River watershed

Subwatershed	Stream Code	Stream Name	Load Allocation (lbs/yr)	Wasteload Allocation (lbs/yr)	Margin of Safety (lbs/yr)	TMDL (lbs/yr)
Clear Fork	WVKC-47	Clear Fork above Dorothy (Troutwater)	12,800	28,884	2,194	43,879
Clear Fork	WVKC-47-F	Stonecoal Branch	349	360	37	746
Clear Fork	WVKC-47-G-1	Dow Fork	165	439	32	636
Coal River	WVKC-31-C	Cold Fork	241	2,411	140	2,792
Coal River	WVKC-33	Haggle Branch	179	NA	9	188
Coal River	WVKC-32	Horse Branch	394	2,182	136	2,712
Coal River	WVKC-35-D	Threemile Branch	104	876	52	1,031
Coal River	WVKC-35.8	Unt/Coal River RM 52.7	138	2,409	134	2,681
Marsh Fork	WVKC-46-G-2	Martin Fork	580	1,534	111	2,225
Marsh Fork	WVKC-46-J-2	Bee Branch	223	NA	12	235
Spruce Fork	WVKC-10-T-5	Hunters Branch	979	NA	52	1,030

NA = not applicable.
UNT = unnamed tributary.

pH TMDLs

As discussed in Section 7.4.1 of the TMDL Report, a surrogate approach was used for TMDL development of pH-impaired waters. It was assumed that reducing in-stream metals (iron and aluminum) concentrations to meet water quality criteria (or TMDL endpoints) would result in meeting the water quality standard for pH. The original iron reductions, coupled with the aluminum reductions needed to achieve the revised criterion, maintain acceptable pH quality in affected waters, as depicted on the "pH Results" page of the "Coal River Dissolved Aluminum Addendum TMDL_Allocations_12_15_06.xls" spreadsheet

Public Participation

In addition to the public meetings and public notice associated with the original Draft TMDLs, the Draft Dissolved Aluminum TMDL Addendum was advertised in local newspapers on July 13, 2006. Two interested parties submitted comments during the public comment period that began on July 13, 2006 and ended on August 11, 2006. Those comments are compiled and responded to below. Comments suggesting editorial revisions were also received from the United States Environmental Protection Agency Region 3, and DEP made the suggested revisions.

One commenter argued that dissolved aluminum TMDLs should not be presented for Three Mile Branch of White Oak Creek (WVKC-35-D) and Cold Fork of Laurel Creek (WVKC-31-C) because historical water quality monitoring information indicates that the average dissolved aluminum concentration does not exceed 750 µg/L.

The commenter compared the average value of measured dissolved aluminum concentrations to 750 µg/L and concluded that the streams were not impaired. This comparison is not appropriate because the operable dissolved aluminum criterion is that aimed at protection of acute impacts to aquatic life, which includes a one-hour exposure duration component and an allowable exceedance frequency of once per three years. DEP's impairment decision methodology for acute aquatic life protection criteria deems a waterbody impaired if two or more observed values exceed the criterion in any three-year period. Discharge Monitoring Reports submitted by the commenter for an in-stream monitoring station in Three Mile Branch demonstrate impairment. The in-stream monitoring results for Cold Fork mentioned by the commenter are not in DEP's possession.

Given the large number of impaired West Virginia waters and the limited resources for TMDL development, DEP's program must focus on efficiency. When working in a specific geographical area, all impaired waters and all impairments of those waters are attempted to be addressed. Although DEP's pre-TMDL monitoring activities are among the most robust efforts implemented nationally, monitoring frequency, duration and sample location resolution are insufficient to comprehensively assess water quality consistent with the exposure duration and exceedence frequency components of applicable water quality criteria. Water quality modeling is therefore necessary. DEP has decided to present TMDLs for all named and coded waters where predictive modeling indicates that existing pollutant reductions are needed to ensure compliance with water quality criteria.

Cold Fork and Three Mile Branch were not monitored for dissolved aluminum during DEP's pre-TMDL monitoring effort. Point and nonpoint sources of aluminum are present in both watersheds. Both waters are impaired pursuant to pH water quality criteria, with multiple observances of pH less than six standard units. Additionally, both watersheds include significant percentages of land use under active mining.

DEP must account for existing point source discharges and judge the cumulative effect of point sources discharging in the presence of existing nonpoint sources. Many mining permits do not contain effective final effluent limitations for aluminum, but all are likely to contribute aluminum. For the baseline condition, DEP chose to represent all mining discharges in the Coal watershed at the highest expected concentration (3.95 mg/L). That value is equal to the 98th percentile Discharge Monitoring Report value for mining point sources in the Coal River watershed. In the subject waters, those "worst-case" point source loadings were reduced only after determining that the significant reduction of loadings from abandoned mine lands (> 99%) were not sufficient to ensure compliance with criteria. The resultant wasteload allocations for mining point sources in Cold Fork and Three Mile Branch (1.19 and 1.98 mg/L, respectively) are reasonable, achievable and less stringent than those that may be prescribed in the absence of a TMDL (0.75 mg/L).

One commenter presented information that the causative sources of dissolved aluminum impairment in Horse Branch (WVKC-32) are two AML seeps and suggested that the primary focus of the TMDL should be the pollutant reduction from those AML sources. The commenter further proposed that wasteload allocations should not be prescribed for precipitation induced point sources, because the discharges are compliant with water quality criteria.

DEP's allocation of aluminum in Horse Branch is consistent with the commenter's first suggestion. The TMDL focuses on the problematic AML seeps by prescribing very significant pollutant reductions down to the value of water quality criteria. The significant flow (97 GPM) associated with the seeps remains, with aluminum concentration at the value of the acute criterion. Because the assimilative capacity for aluminum is limited, point sources also require effluent limits equal to the value of the criterion to ensure attainment of water quality standards. The suggestion to not prescribe wasteload allocations is impractical because without an allocation, existing point sources could not discharge any aluminum. Assuming existing discharges are compliant with "criteria end-of-pipe" as indicated, the prescribed wasteload allocations will allow continued discharge without the need for additional treatment.

One commenter disagreed with the revision of the dissolved aluminum water quality criteria.

The currently effective dissolved aluminum water quality criteria were properly promulgated in accordance with applicable rules for the revision of water quality standards and have received EPA approval. The Dissolved Aluminum Addendum reflects DEP's responsibility to develop TMDLs for applicable water quality standards. The dissolved aluminum TMDLs that were developed pursuant to the previously applicable, 87µg/L, chronic aquatic life protection criterion for warmwater fisheries remain a component of this effort, but are to be implemented only if that criterion becomes applicable in the future.