United States Department of the Interior

New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

Dr. Jim Davis, Bureau Chief
Surface Water Quality Bureau
New Mexico Environment Department
P.O. Box 26110
Santa Fe, New Mexico 87502

Dear Dr. Davis:

Thank you for the opportunity to review the Draft Total Maximum Daily Load (TMDL) for aluminum, turbidity, and stream bottom deposits in the Red River Basin. Although, at this time, there are no known reports of threatened or endangered species in this segment of the Red River, the U.S. Fish and Wildlife Service (Service) has significant concerns regarding migratory birds and their supporting habitat.

Before discussing the details of the Red River TMDL, we would like to review some general limitations of the New Mexico TMDL regulatory program. First, although the name of the program implies that "Total" pollutant loading to a waterbody is considered, in fact only the pollutant portion that remains in the water-column in the dissolved phase is regulated. While we recognize that the current regulatory interpretation of the Federal and State Clean Water Acts does not include consideration of sediment quality, ignoring the particulate phase will result in continued loading of pollutants to the bed sediments. Thus, even when dissolved water quality criteria are met (for aluminum in the Red River TMDL), sediments may continue to accumulate pollutants at concentrations potentially harmful to fish and wildlife. Furthermore, TMDLs (such as this one for the Red River), are only a snapshot of conditions in a watershed, and may not reflect infrequent loading events due to storms or unusually wet or dry years. Lastly, a TMDL is a regulatory tool, and does not necessarily address the myriad of ecological health issues influenced by pollutant loading.

The following comments are organized according to sections of the Red River TMDL.

Introduction

The legend in the TMDL's Figure 1 indicates that the aluminum source areas are hydrothermal scars. The figure legend should be revised to indicate other source areas mentioned in the text, such as the Molycorp mine waste-rock piles, tailings ponds, and the towns of Red River and Questa.

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Background Information

The discussion of "alteration scars" goes into detail on the physical and geochemical processes that result in metal and sediment loading to the Red River. Whereas, the discussion on molybdenum mining discusses only the geography and history of the Molycorp mine, and gives no information on the physical and geochemical processes that result in metals and sediment loading to the Red River. Loadings from both sources should be objectively quantified and presented.

Target Aluminum Loads

Correlation does not imply causation. The assumption that brown trout density is *caused* solely by aluminum loading is erroneous. The toxicology of metals to biota is complex and can not be predicted based on a weak *correlation* between one variable and another. Moreover, using the target aluminum loading calculated based on this perceived biological response would result in aluminum concentrations greater than 15 milligrams per liter (mg/L) at some locations (172 times greater than the chronic surface water quality criterion for aluminum of 0.087 mg/L), or, 1.19 mg/L for the entire middle reach of the Red River (14 times greater than the chronic surface water quality criterion for aluminum) (Appendix C, Table C5). As is pointed out on page 17 (Target Aluminum Loads), maximum possible water concentrations will be less than ~1 mg/L due to solubility constraints, so the additional 14 mg/L of aluminum will end up in sediments and accumulated into biota. Target aluminum loads should be calculated based on the chronic surface water quality criterion for aluminum (preferably expressed as a total, but dissolved will satisfy New Mexico regulatory standards).

Target Stream Bottom Deposit Loads

Only one study was presented to justify the 30% target load capacity for percent stream bottom deposits (fines), and it was not indicated in the references cited section if this is a peer-reviewed paper. If available, additional references should be used to justify the assumptions of this section. If only this one reference is used, then the more conservative value of 20% should be applied, as described in the text. Preferably, any value should be considered provisional until actual field studies confirm the relationship between sediment fines and biological response in the Red River (as discussed in Appendix F). We recommend that a reference site more reflective of the geomorphology of the Red River (e.g., Rio Hondo, Rio Pueblo de Taos) be used, rather than Columbine Creek.

TMDL and Allocation of Pollution Loads

As discussed above, aluminum load targets based on fish population data alone are inappropriate, and should not be used to determine load allocations. Fish tissue aluminum accumulation, invertebrate population dynamics and tissue burdens, or surface water quality standards are more appropriate.

In Appendix C, Table C4, an average aluminum concentration is used to calculate aluminum loading in pounds per day (lbs/day). To reflect a true "total" loading, total aluminum measurements only (Table C2) should be used to calculate loading, rather than an average of both dissolved and total measurements. Table C6 should then include maximum total aluminum measurements, and include the lower Red River locations.

The relationship between flow and aluminum loading appears to be based on limited data. Information should be presented which confirms that the May 1999 flow and concentration data are representative of typical conditions in the watershed (e.g., historical flow data, precipitation). Because TMDLs also describe loading on a yearly basis, low and high loading years should also be considered to determine best and worst case scenarios to allow for adequate load reduction designs. Understandably collection of these data may be time consuming and expensive, but a combination of existing data, and data collected as part of the U.S. Environmental Protection Agency Comprehensive Environmental Remediation, Compensation, and Liability Act (CERCLA) Investigation, could be used to refine the TMDL model presented.

Load Allocation

This section states that "Impairments from aluminum loading appear to be localized and are not cumulative (Figure 8)." There is insufficient physical, chemical, and biological data to make this conclusion based on Figure 8. As mentioned above, correlations between fish populations and aluminum loading are inappropriate. Furthermore, there is no sediment data on aluminum concentrations and percentage fines presented for the Red River that supports statements about localized aluminum loading.

There is no discussion of the study contracted by the New Mexico Office of Natural Resources Trustee (Allen *et al.* 1999)[1] that discusses changes in aluminum loading to the Red River over time. This is an important study to consider, because it demonstrates that aluminum loading increased following creation of the Molycorp mine waste rock piles. This suggests that the Molycorp mine may have a greater effect on aluminum loading to the Red River than is considered in this TMDL. At this time, no alternative explanations have been documented to

[1]Allen, B.D., A.R. Groffman, M.C. Molles Jr., R.Y. Anderson, and L.J. Crossey. 1999. Geochemistry of the Red River stream system before and after open-pit mining, Questa area, Taos County, New Mexico. Final Report prepared for the New Mexico Office of the Natural Resource Trustee, Santa Fe, NM.

explain this observed change in aluminum loading to the Red River. If alternative explanations are available, they should be presented.

Identification and Description of Pollutant Sources

The photo inset of the "Hansen Creek scar area" beside the section heading could imply that natural scar areas are the only source of pollution loading to the Red River. While it is probable that natural scar areas contribute to the pollutant loading, other sources, such as the towns of Red River and Questa, over-grazed grasslands, and the Molycorp mine, also contribute to pollutant loading. Because this is such a sensitive issue, the picture should be removed, or a variety of photographic examples be provided (e.g., Molycorp mine waste-rock piles, the town of Red River). Likewise, the third bullet describing sources, should make specific mention of the Molycorp mine waste-rock piles as a potential source, as should the next set of bullets that describes in detail the potential impact of natural scar areas on pollutant loading.

Based on figures presented in Table C4, Appendix C, 1,729 lb/day of aluminum out of a total of 3,067 lb/day aluminum load the Red River below the Molycorp mine. Over 1,300 lb/day come from Capulin Canyon which drains one of Molycorp's waste-rock piles. According to the figures in Appendix C, this is the largest single source of aluminum in the watershed. While some of this aluminum loading may be due to pre-existing sources, such as buried hydrothermal scars, there seems to be clear evidence that mining activities should be considered in more detail as a source of aluminum loading to the Red River.

Monitoring and Implementation Plan

Given the complex remedial actions in progress at the Molycorp mine, activities planned as part of the New Mexico Mining Act Closure/Closeout Plan and the U.S. Environmental Protection Agency CERCLA program should be discussed as they apply to future monitoring and implementation of Best Management Practices.

Use of Biological Data to Assess Aquatic Life Uses in the Red River

This section suggests that biological data for the Red River may indicate a full support of New Mexico Water Quality Standards Designated Use classification when physical and/or chemical data indicate only partial support (Appendix D- Biological Analyses). While the data presented in Appendix D (apparently provided by Chadwick Ecological Consultants [CEC; 1997 - 2001]) provides some invaluable information on the biological status of the Red River, both the Service and the New Mexico Department of Game and Fish have provided comments noting some shortcomings and/or alternate interpretations of these data. Chadwick Ecological Consultants has questioned the correctness of some of the Service's recent comments on their 2000 fish sampling results (included in Appendix D). It is unclear as to why the TMDL was used as a public forum for discussing internal technical disagreements. While an appendix that briefly

reviews the basis for the TMDL fish population data is appropriate, the added discussion regarding the Service's prior correspondence should be removed. Unfortunately, addition of these comments in this public forum now necessitates a response from the Service.

While CEC correctly identified some errors in the Service's review of CEC's 2000 report, most of their objections are due to the Service's differing interpretation of their data (e.g., CEC noted that the Service incorrectly calculated fish condition factors- recalculated values indicate that fish condition does not decrease below Molycorp property, instead both fish weight and length decrease [Figure 1]). CEC is concerned that the Service's interpretation of their data will lead to "*...restoration efforts along the Red River watershed [that] could inappropriately focus on water quality issues not potentially producing the maximum or even significant benefits to aquatic life*." Based on the data provided in the TMDL, and information used to propose the Molycorp site for inclusion on the CERCLA National Priority List, there are sufficient data to suggest that the Molycorp mine may continue to contribute to the impairment of the water quality and ecological health of the Red River. The Service agrees that, based on CEC data, Hansen Creek above the mine has an impact on brown trout populations in the Red River, and that fish populations in the river may have improved following new tailings and waste-rock seepage control methods instituted by Molycorp over the past several years.

However, (1) the cause of the decrease in trout populations below Hansen Creek has not been identified (e.g, habitat, contaminants, interspecies competition), and (2) the weight-of-evidence suggests that the biological integrity of the Red River may still be impaired. Very high TMDL-calculated aluminum loading at Capulin Canyon, decreases in fish length and weights along the river adjacent to the mine, the absence of a sensitive trout species along the river adjacent to the mine (rainbow trout; rainbows have been stocked since 1928 and by now should have established a minimal self-sustaining population), anecdotal evidence that angler success has decreased, and the study by Allen *et al.* (1999) demonstrating that aluminum loading to the Red River increased following the creation of waste-rock piles, all suggest that mining has some adverse effect on the river.

Data gathered as part of the U.S. Environmental Protection Agency CERCLA activities at Molycorp and the Red River watershed will likely prove useful in refining the Red River TMDL. This, benthic invertebrate monitoring, more detailed fishery health studies that incorporate water and sediment sampling, fish population studies, caged-fish and/or laboratory toxicity studies,and habitat evaluations will help develop the weight-of-evidence necessary to properly manage the health of the Red River ecosystem.

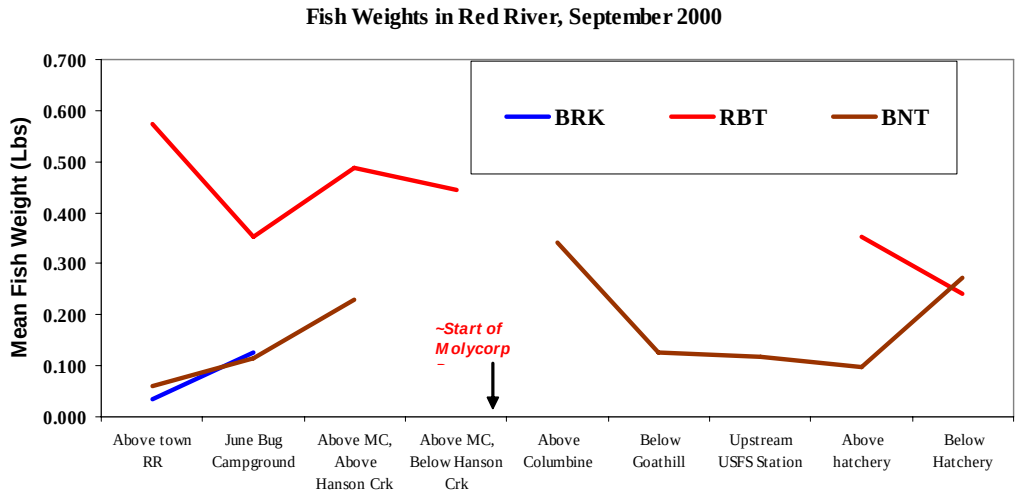

Figure 1. Fish weights calculated measured by CEC (2000 data).

Implementation Plan

This section focuses the discussion of the importance of natural background sources of aluminum and other metals to the Red River watershed, and minimizes the impacts from other sources such as grazing and mining. Appendix D recommends that the Service exercise "extreme caution" so that the "*restoration of the Red River watershed is not incorrectly focused only on reaches and activities associated with Molycorp*." The Service has acknowledged in the past that inputs of metals to the Red River are due, at least in part, to natural sources (e.g., hydrothermal scars). This TMDL, however, places too much emphasis on these natural sources, and downplays the potential inputs from the Molycorp mine. Clearly, a balanced, scientifically objective approach, is necessary by all parties involved in the remediation and restoration of the Red River ecosystem. The Service is committed to working with private entities, and State and Federal agencies, in identifying contaminant sources, controlling their inputs, and restoring the Red River ecosystem.

If you have any questions, please contact Russ MacRae at (505) 346-2525, ext. 124.

Sincerely,

Joy E. Nicholopoulos
Field Supervisor

Dr. Jim Davis, Bureau Chief

cc:
Environmental Program Director, Molycorp, Inc. Questa, New Mexico
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico (Attn: Jim Stuart)
Bureau Chief, New Mexico Environment Department, Surface Water Quality Bureau, Santa Fe, New Mexico
Regional Environmental Officer, U.S. Department of the Interior, Office of Environmental Policy and Compliance, Albuquerque, New Mexico
Field Manager, Bureau of Land Management, Taos, New Mexico (Attn: Sam DesGeorges)
Molycorp Project Manager, U.S. Environmental Protection Agency, Dallas, Texas
Superfund Liaison, U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, Dallas, Texas