



March 22, 2010

U.S. Environmental Protection Agency
EPA Docket Center (EPA/DC) Water Docket, MC 28221T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

To Whom It May Concern:

I write to you today on behalf of the Freshwater Mollusk Conservation Society (FMCS) to comment on the *Draft 2009 Update Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater*, dated December 2009. The FMCS is dedicated to the conservation of and advocacy for freshwater mollusks, one of North America's most imperiled faunas. The membership of FMCS consists of state, federal, academic, and private biologists, many of whom work directly with the numerous federally endangered and threatened mollusks and many additional species of concern at the state level, and are considered to be experts in their biology, conservation and recovery.

The mollusks are the second-most diverse phylum of animals and are one of the most successful groups adapted to freshwater. There are approximately 300 species of freshwater mussels and 500 species of gastropods native to North America. With over 100 species considered federally threatened or endangered, and countless more species afforded some conservation status by state agencies or other conservation groups, freshwater mollusks are one of the most imperiled faunas in North America (Lydeard *et al.* 2004). These animals provide valuable, and in some instances irreplaceable, ecological services (Dillon 2000, Vaughn and Hakenkamp 2001). Economically, freshwater mussels are used in the cultured pearl industry, a multi-million dollar a year industry in Tennessee alone (Hubbs 2006).

Freshwater mollusks are impacted by numerous factors, including habitat destruction, environmental contaminants and invasive species. Freshwater mussels are suspension and deposit feeders that live burrowed in the sediments of lakes and rivers, and thus may be taking in ammonia (and other contaminants) on a near continuous basis. This near continuous exposure and sedentary nature makes them vulnerable to chronic as well as episodic ammonia releases. For example, Goudreau *et al.* (1993) found effects of ammonia and other contaminants on mollusks for several kilometers below wastewater treatment facilities.

While there are some technical and policy issues with the proposed criteria, they are a positive step relative to the 1999 criteria that did not include data for freshwater mussels. We appreciate the work that went into producing this draft update and the opportunity to provide comments, and encourage the

development of a final update that incorporates the comments received. For clarity, our comments are grouped into two categories, the criteria themselves and the decision to propose a bifurcated criteria approach.

2009 Draft Water Quality Criteria for Ammonia

The proposed criteria will benefit many species of freshwater mussels. However, ammonia toxicity has been tested for only about 16 of the nearly 300 species of freshwater mussels in North America. Thus, there may be considerable variation in species-specific effects. In addition to freshwater mussels, snails have been determined to be particularly sensitive to the effects of ammonia. Specifically, studies have demonstrated that snails may be as sensitive to the acute or chronic ammonia effects, similar to effect concentrations for various mussels (Note in particular Figure 6 in Besser *et al.* (2009)). We recommend that toxicity data for snails also be included in addition to toxicity data for freshwater mussels and that the revision be based on mollusk data in total.

The decision to use the 5th percentile of the genus mean acute values (GMAVs) to derive the Final Acute Value (FAV) would leave 4 of the 12 mussel species in the database under protected. Consideration should be given to lowering the FAV for culturally and ecologically important species like mussels as is done for recreationally or commercially important species.

Similar concerns exist for the derived Criterion Maximum Concentration (CMC) and Criterion Continuous Concentration (CCC) values. The CMC without mussels (Table B, pg 9) would not be protective of any species of equal or greater sensitivity to ammonia as the Asian clam. Similarly, while the 2009 update claims the CCC is "conservative", it is not, given that there is little margin of safety. We suggest EC10s be used as the level of protection for a more protective approach.

The established procedures for criteria derivation include a "sound science clause" allowing discretion to vary from that approach on occasion. Data quality objectives for glochidia tests are outlined in ASTM (2009; standard E2455), and data concerning the duration of the free-living portion of the glochidia life stage is available. Therefore, data from glochidia toxicity testing should not be excluded from the criteria.

The requirement of partial or full life cycle tests is unrealistic for an organism that might live for over 100 years. The perspective that a reduction in growth over a 28-day exposure may be a transient effect ignores the possibility that growth would be further impaired over a longer exposure to ammonia, for which chronic environmental exposures are known. Therefore, growth endpoints from chronic mussel toxicity tests should not have been excluded.

The bifurcated criteria approach should be abandoned in favor of applying the criteria derived with mussel data to all waters of the United States

The more liberal CMC and CCC values from the proposed bifurcated ammonia criteria will not be protective in those waters where mussels used to be present, but because of ammonia or other contaminants are no longer present, or perhaps more importantly, are simply undetected. Rare species are difficult to locate with standard surveys, and this is exacerbated by their low detectability because of their rarity. Seasonal movement in the substrate, both horizontal and vertical, the small size of some species, and cryptic coloration or shell shape, also contributes to low detectability of freshwater mussels. The low detectability of numerous species needs to be given serious consideration before implementing bifurcated criteria for a toxicant as important as ammonia.

There is no implementation plan proposed for defining how waters with and without mussels will be determined. This presents numerous complications for rare mussels (which are by definition difficult to find), waters for which mussels have been extirpated but which may support mussels if conditions improve, the time span for which survey records will be viewed as documenting mussel presence or absence, etc. In the absence of clear guidance, the actual implementation of the bifurcated criteria will be very easily subjective and complicated, with the possibility of a patchwork of state by state guidelines and recommendations.

In closing, the FMCS appreciates the effort on the part of the USEPA to revise the 1999 ammonia criteria and include the recently developed freshwater mussel toxicity data. Collectively, we are in a better position to understand the effects of ammonia on this imperiled faunal group and to take action to protect and restore mussel populations from environmental contaminants. We encourage the USEPA to proceed with developing final criteria that incorporates the comments received. We hope that the comments we have provided above will be beneficial to this endeavor.

Sincerely,



Dr. W. Gregory Cope, President
Freshwater Mollusk Conservation Society

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