WSWRA
WASHINGTON STATE WATER RESOURCES ASSOCIATION

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SENT VIA E-MAIL

October 29, 2012

Ms. Martha Hankins
Department of Ecology
Toxics Program
Olympia, Washington

Dear Ms. Hankins:

I appreciate the opportunity to comment on Ecology's *Sediment Management Standards (SMS) Rulemaking Document: WDOE Publication no. 12-09-054,* The Washington State Water Resources Association (WSWRA) is the coordinating agency for irrigation districts in Washington State. WSWRA represents more than 100 irrigation districts providing water to over 1.1 million acres of irrigated agriculture in Washington State. These districts operate and maintain thousands of miles of canals and laterals with return flows to rivers and streams across the state.

General Comments

WSWRA members have concerns regarding the proposed SMS rule and its potential impacts on herbicide use under the National Pollutant Discharge Elimination System (NPDES). The SMS document outlines comments on behalf of WSWRA members on current and proposed Sediment Quality Standard (SQS) values and the alternatives proposed for establishing freshwater sediment standards. It is understood that contamination of water and sediment correlate with chemical contaminant body burdens of salmonids and humans, thereby posing a consumption and human health problem.

Copper sulfate is an important aquatic herbicide to Washington irrigators and it is one of four active ingredients regulated under the Washington State Department of Ecology (WDOE) Irrigation General NPDES and SWD permit that is commonly used in irrigation canals for the control of aquatic algae and macrophytes. Copper sulfate is applied to canals and laterals in order to maintain water flow for efficient delivery of water to agricultural areas, and it is the

most commonly used copper product; however, liquid chelated formulations are also available and are becoming more widely used.

Alternatives to copper products include mono-amine endothall formulations and acrolein. The mono-amine formulation of endothall is not a substitute for copper in large canals and laterals due to its great expense, high toxicity to fish, and its limited distance of efficacy (approximately 10-15 miles).

Copper is also one of several inorganic metals of primary interest at both State and Federal levels, as it has been listed as a persistent, bioaccumulative and toxic (PBT) chemical contaminant of concern in the Puget Sound (WDOE: *Fish Consumption Technical Support Document*, 2011). In addition, it is also a chemical of concern by US EPA (US EPA: *Framework for Metals Risk Assessment*, 2007). Washington State irrigators take necessary and prudent measures to abide by state NPDES requirements under the Federal Clean Water Act (not exceeding WDOE's maximum daily allowable discharge concentration of 25 ug/L) as a source control method to avoid contamination of water and sediment in natural water systems by aquatic herbicides, such as copper sulfate. In addition, irrigation districts employ a number of best management practices to limit the discharge of copper. Engineering controls are often utilized to reduce or eliminate the outflow of copper before reaching a discharge point of compliance. Additionally, internal mixing and of treated and untreated water and on farm deliveries are used to reduce discharge limits below permit limitations prior to being discharged. We ask that WDOE consider the potential impacts of the SMS rule on the successful operation of Washington irrigation districts, including canal/lateral maintenance and efficient water delivery.

We have two primary concerns:

1. The current and proposed SQVs may not be directly applicable to irrigation districts in central and eastern Washington because SQVs were derived from highly contaminated areas in urban and industrial locations.

2. The fish consumption technical support document and SMS rule should not impact currently allowed levels of herbicide discharge under NPDES.

We recommend the following:

1. Do not assume applicability of SQVs and TEC/PEC values to evaluate sediments of concern in irrigation districts. Instead, that evaluation should be done on a site-by-site basis, accounting for the unique characteristics of the districts' water chemistry, regional background levels, and historical and current discharges.

2. Weigh operational and economic impacts of increasing limitations on copper sulfate discharge before proposing an NPDES change that, in our opinion, would not be supported by available fish tissue and sediment data from central and eastern Washington.

Specific Comments

Alternatives for Freshwater Sediment Standards

The proposed SMS rule provides alternatives to establish freshwater sediment quality standards for the protection of the benthic community since the current SMS provides only basic guidelines.

Under Alternative 1 (Current rule, the No Action Alternative) sediment cleanup standards for freshwater sediment in central and eastern Washington would rely on the current SMS narrative standard, where potential toxicity evaluations will be compared with existing chemical guidance values established by MacDonald et al (2000). There are limitations to consider when utilizing the threshold effects concentrations (TEC) and probable effects concentrations (PEC) to evaluate the potential for benthic impacts at freshwater sites in irrigation districts. Listed below are the limitations:

The TEC and PEC values incorporate mixture effects of other contaminants present in the sediment when determining the predicted toxicity. These mixture effects may not be applicable to sediment at points of discharge from irrigation systems. Other persistent, bioaccumulative, and toxic (PBTs), such as PCBs and PBDEs, are not present at similar levels observed in industrial/urban areas, and the additive or synergistic effects accounted for in these values may overestimate toxicity of sediment found in or near irrigation districts. This limitation should be considered if Alternative 1 is chosen.

Water chemistries vary significantly within each irrigation district. For example, water hardness is significantly higher in the Columbia Basin Project compared with water found in the Wenatchee River, and total dissolved copper within the water column significantly decreases as water hardness decreases (WDOE, 2007). Therefore, unique environmental chemistries should be carefully considered when evaluating sediment affected by copper discharge. The US EPA has recently adopted a method when estimating risk associated with copper exposure (US EPA, 2007; Santore et al, 2001; Peters et al 2011). This biotic ligand model (BLM) considers water chemistry (e.g. pH, alkalinity), metal speciation, and cationic completion on metal toxicity in fish (Paquin 2002; US EPA 2007). Further, this model predicts toxicity to the same benthic vertebrates (De Schamphelaere, 2002, 2004) also considered in SQG values generated for toxicity evaluations under the current SMS rule (Michelsen, 2003) and Alternative 2 under the proposed changes for Freshwater Sediment Standards. This type of model should be considered when evaluating copper toxicity in irrigation districts since it would provide a much more rigorous evaluation of copper toxicity.

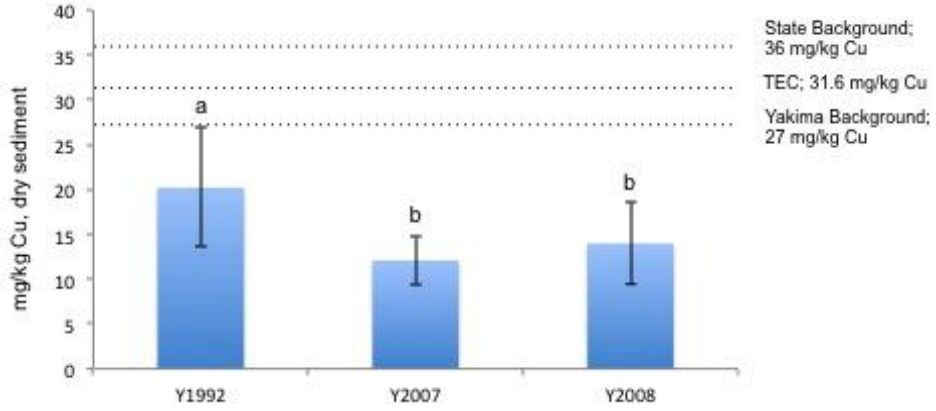
If DOE evaluates freshwater sediment toxicity for central and eastern Washington using SQGs (datasets complied by Michelsen [2003], current SMS, and Michelsen [2011], Alternative 2) we ask that the following be considered:

The SQS values were formulated to provide a reference for certain PBT chemicals in order to help identify sediment cleanup sites or areas of concern in Washington State. The SMS provides SQS values from the *most impacted sediment located in productive and nearshore and estuarine*

areas where they pose risks to human health and the environment, including the Puget Sound and lower Columbia River. Generation of these values was based on sites primarily west of the Cascades, although some sites were considered in eastern Washington (e.g. Spokane River and Lake Roosevelt, both listed under 303[d]). Most of the canals and laterals supporting agriculture are located in central Washington (Yakima Basin and the mid-Columbia Basin), outside the areas targeted for SQS sampling. Additional sampling is needed in central Washington before establishing reference values for this region.

Current Copper Use

According to data gathered from WDOE's Environmental Information Management (EIM) database, copper concentrations in sediment collected from Columbia Basin Project Irrigation Districts between 1992-2008 did not exceed TEC and SQVs (**Figure 1**). Further, copper concentrations fell below background levels identified for Washington state (36 mg/kg), Yakima (27 mg/kg) and nationally (25 mg/kg; Buchman 2004). It should be noted that the Columbia Basin Project irrigation districts are the largest users of copper sulfate of all irrigation districts, and that other districts, such as Sunnyside and Roza, apply little to no copper to their canals and laterals. In 2012, the Columbia Basin Project irrigation districts used approximately 30,000 lbs of copper sulfate for the control of algal species (C. Gyselink, personal communication).

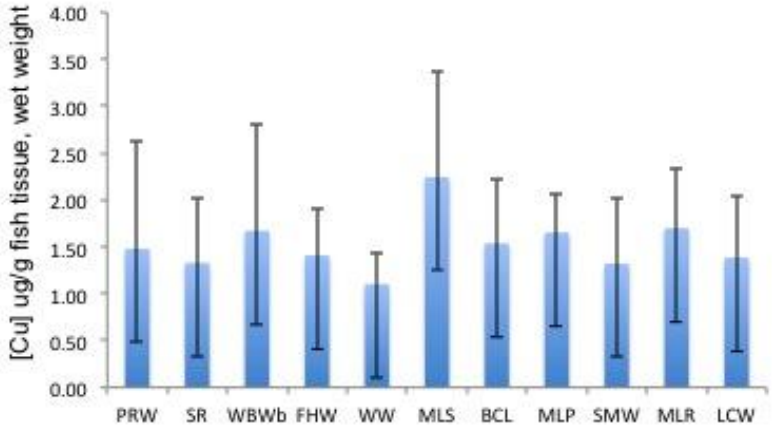


[a] WDOE Study ID COL5N92124: *Columbia Basin Irrigation Project Survey*
[b] WDOE Study ID CBUR0007: *A Study of Copper Discharge from Irrigation Canals*
TEC: threshold effect concentration; MacDonald et al, 2000

Figure 1. Mean copper concentrations in rivers surrounding the Columbia Basin Project, 1992-2008. Dry sediment from various locations in waterways in the Columbia Basin Project were tested for copper levels following the irrigation season. Copper concentrations fell below the TEC (31.6 mg/kg Cu) and PEC (149 mg/kg Cu) values (MacDonald et al, 2000), and below SQVs set by Michelsen in 2003 and 2011, 80 mg/kg Cu and 320 mg/kg Cu, respectively. Cu sediment concentrations fell below background levels for both Washington state and Yakima (Michelsen, 2011).

In 1992, USGS conducted a survey of waterbodies in Grant County (within the Columbia Basin Project) and found that copper in tissues derived from bottom-feeding fish (e.g. suckers, carp) (WDOE, EIM database) exhibited levels at or below the threshold of toxic body burden. In addition, consumption of fish with similar copper load under current consumption standards (6.5 g/day; WDOE *Fish Consumption Technical Support Document*) would not exceed maximum

recommended limit 10 mg/kg/day (**Figure 2**; World Health Organization, 1996). This data, in conjunction with the sediment data referenced in Figure 1, suggest that accumulation of copper in fish from the interior Columbia Basin poses a low risk to human health. Additional fish tissue data could be collected to affirm this assertion.



WDOE Study ID USGSCB92

Figure 2. Mean copper concentrations in bottom-feeding fish in various water bodies in Grant County, 1992. Wet tissue samples of sucker, perch or carp collected from various wasteways, reservoirs and lakes in Grant County.

Concluding Remarks

WSWRA request's that source-control regulation through the implementation of NPDES permits, specifically to copper sulfate, be approached in a site-specific manner, and we offer our assistance to ensure this analysis is carried out in concert with the most rigorous techniques available. Factors that should be considered when determining copper bioavailability in sediment of irrigation districts that utilize copper sulfate include: a) district-specific water chemistry (e.g. alkalinity), b) regional background levels, c) water flow, d) frequency of application, and e) dissolved organic carbon.

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Cc: WSWRA Board of Directors