EPA Comments on Rulemaking Procedures Initiated to Amend the Water Quality Regulations, LAC 33:IX.1101, 1105, 1107, 1109, 1113, 1115, 1119, 1121, and 1123 (WQ097)

January 29, 2020

EPA appreciates the opportunity to review and discuss draft amendments to the state's water quality regulations cited above prior to publication of these amendments for public comment. This early review of the state's proposed rule provided EPA and the state with adequate time to discuss and come to agreement on issues identified in EPA's review.

During this early review, EPA provided several recommendations to improve the clarity and protectiveness of the state's water quality standards. The state further refined its draft proposal based on EPA's recommendations, made note of others for future revisions, and explained its rationale for not implementing some recommendations.

EPA supports the proposed amendments to Louisiana's WQS. EPA specifically supports LDEQ's proposals to adopt freshwater ammonia criteria for aquatic life protection, update authorizing provisions for water quality standards variances and the state's antidegradation policy, the addition of the option for freshwater site-specific copper criteria to be developed using the Biotic Ligand Model (BLM), and clarification of boundary descriptions for multiple subsegments in the state.

LDEQ's proposed adoption of ammonia criteria is consistent with those revised recommendations for freshwater ammonia criteria published by EPA in 2013. In updating the 1999 ammonia criteria recommendations, EPA conducted an extensive literature review that incorporates new toxicity data from 69 studies, including new data on freshwater mussels and gill-bearing snails, which are both sensitive to ammonia toxicity. In particular, freshwater mussels are more sensitive to ammonia than the organisms included in the dataset used in EPA's 1999 criteria document.

LDEQ's proposed addition of the option for freshwater site-specific copper criteria to be developed using the Biotic Ligand Model (BLM) is also consistent with EPA recommendations. The bioavailability of copper in surface waters is affected by many variables. EPA revised the hardness-based aquatic life criteria for freshwater copper in 2007, to a biotic ligand model (BLM) to better account for these variables. The BLM was developed using data that became available after the development of EPA's 1984 and 1995 criteria recommendations, and includes updated toxicity information for six sensitive species, (*Ceriodaphnia dubia*, *Lithoglyphus virens*, *Scapholeberis sp*., *Actinonaias pectorosa*, *Hyalella azteca*, and *Juga plicifera*), which includes a freshwater mussel. The BLM quantitatively accounts for the effect of individual water quality parameters that modify metal toxicity in freshwaters. Specifically, the BLM addresses the influence of both biotic and abiotic (organic and inorganic) ligands in the calculation of bioavailability of copper to aquatic organisms over a broad range of conditions. Ten input parameters are included in the model to determine accurate criteria that are neither over nor under protective based on characteristics of the receiving water that affect the toxicity of copper. The BLM can be applied cost-effectively and across spatial and temporal scales.

EPA likewise commends LDEQ for proposed revisions to its antidegradation policy consistent with the 2015 revisions to antidegradation policy and implementation requirements found in federal regulation at 40 CFR part 131.12.

EPA provides the following recommendations for LDEQ's consideration for future water quality standard revisions and triennial reviews:

- LDEQ has indicated that it is evaluating appropriate bioaccumulation factor (BAF) values based on lipid fractions per trophic level for appropriate resident Louisiana aquatic species that it will use to update the state's human health criteria (HHC) in the near future. States have flexibility to adjust national BAFs to reflect local conditions. While this process could be carried out for all parameters in Table 1 of the water quality standards in a single rulemaking, it could also be done in phases as BAFs are generated for different chemical categories or groups of individual chemicals of primary concern. EPA supports these efforts and remains available to help Louisiana derive state-specific BAFs in a timely manner.

- EPA continues to recommend the inclusion of an RSC factor in HHC calculations to account for non-water exposure sources [both ingestion exposures (e.g., food) and exposures other than the oral route (e.g., inhalation)] so that the entire RfD is not apportioned to drinking water and fish consumption alone. As noted in Section 4.2.1 of EPA's 2000 Human Health Methodology, EPA "emphasizes that the purpose of the RSC is to ensure that the level of a chemical allowed by a criterion or multiple criteria, when combined with other identified sources of exposure common to the population of concern, will not result in exposures that exceed the RfD…" In essence, criteria that reflect 100% of the RfD leave no buffer room for additional exposures from other 'non' ambient water/fish consumption sources that, in aggregate, may result in overexposure of a population to a contaminant. As previously noted by LDEQ, there are additional regulatory authorities external to the Clean Water Act that exist to control other exposure sources, but there may not be complete assurance that controls implemented under these authorities will result in *no* additional exposure to a particular contaminant.

- EPA reviewed LDEQ's present and future plans to evaluate EPA's 304(a) criteria recommendations published since May 30, 2000 (See "304(a) Recommendations" at https://www.deq.louisiana.gov/page/triennial-review). EPA also recommends that LDEQ update its criteria to reflect recent updates to EPA's nationally recommended ambient water quality criteria for cadmium (2016), selenium (2016), as well as aluminum (2018) and cyanotoxins (2019). EPA acknowledges that these criteria updates were released after the state initiated its current triennial review process. EPA appreciates the state's inclusion of both cadmium and selenium in its identification of 304(a) criteria that it will consider for adoption in future rulemakings and hopes it will do the same for aluminum and cyanotoxins in its next triennial revision.

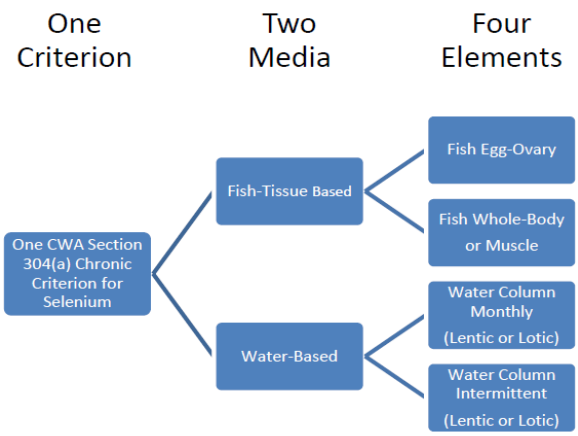
    - Cadmium: EPA published revised aquatic life criteria recommendations for cadmium in 2016 to incorporate the latest scientific information. The updated freshwater criteria are hardness-based equations:

        - acute criterion = $e^{(0.9789(\ln(\text{hardness}))-3.866}$
        - chronic criterion = $e^{(0.79779(\ln(\text{hardness}))-3.909}$

The conversion factors for the freshwater cadmium criteria in Louisiana's current WQS are still applicable and should be retained. The conversion factor of 0.994 for the saltwater acute and chronic criteria is still current and is incorporated in EPA's recommended saltwater cadmium criteria. EPA recommends that LDEQ update the state's freshwater and saltwater cadmium criteria to reflect the updated scientific information.

- Selenium: EPA published an updated freshwater aquatic life criterion for selenium in 2016, which consists of several components to protect aquatic life from chronic effects. Aquatic communities are expected to be protected by this chronic criterion from any potential acute effects of selenium, so there is no acute criterion as part of the 2016 CWA section 304(a) recommendation.

  The chronic criterion includes values expressed both in terms of fish tissue concentration (egg/ovary, whole body, muscle) and water concentration (lentic, lotic), as shown in the following figure:



  EPA recommends that LDEQ consider the adoption of the comprehensive 2016 selenium criterion which is presented in the table below:

Table 1. Summary of the Recommended Freshwater Selenium Ambient Chronic Water Quality Criterion for Protection of Aquatic Life.

Media Type	Fish Tissue[1]		Water Column[4]	
Criterion Element	**Egg/Ovary [2]**	**Fish Whole Body or Muscle [3]**	**Monthly Average Exposure**	**Intermittent Exposure[5]**
Magnitude	15.1 mg/kg dw	8.5 mg/kg dw whole body <u>or</u> 11.3 mg/kg dw muscle (skinless, boneless filet)	1.5 µg/L in lentic aquatic systems 3.1 µg/L in lotic aquatic systems	$WQC_{int} = \frac{WQC_{30-day} - C_{bkgrnd}(1 - f_{int})}{f_{int}}$
Duration	Instantaneous measurement[6]	Instantaneous measurement[6]	30 days	Number of days/month with an elevated concentration
Frequency	Not to be exceeded	Not to be exceeded	Not more than once in three years on average	Not more than once in three years on average

1. Fish tissue elements are expressed as steady-state.
2. Egg/Ovary supersedes any whole-body, muscle, or water column element when fish egg/ovary concentrations are measured.
3. Fish whole-body or muscle tissue supersedes water column element when both fish tissue and water concentrations are measured.
4. Water column values are based on dissolved total selenium in water and are derived from fish tissue values via bioaccumulation modeling. Water column values are the applicable criterion element in the absence of steady-state condition fish tissue data.
5. Where WQC30-day is the water column monthly element, for either a lentic or lotic waters; C_{bkgrnd} is the average background selenium concentration, and fint is the fraction of any 30-day period during which elevated selenium concentrations occur, with f_{int} assigned a value ≥0.033 (corresponding to 1 day).
6. Fish tissue data provide instantaneous point measurements that reflect integrative accumulation of selenium over time and space in fish population(s) at a given site.

- <u>Aluminum:</u> EPA published revised recommendations for aluminum aquatic life criteria in the Federal Register on December 21, 2018. The updated freshwater criteria reflect the latest science and allow users to develop criteria using local water chemistry parameters (pH, dissolved organic carbon, and hardness). Lookup tables are provided in an appendix to the criteria document to find the criteria concentrations which correspond to local water chemistry parameters.

- <u>Cyanotoxins:</u> EPA published national recommendations for Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories (AWQC/SA) for Microcystins and Cylindrospermopsin in May 2019. Microcystins and cylindrospermopsin are two types of toxins produced by cyanobacteria. The recommended ambient water quality criteria for microcystins and cylindrospermopsin consist of three components—magnitude, duration and frequency--that are considered protective of human health in recreational waters. In developing these recommendations, EPA incorporated the existing peer-reviewed and published science on the adverse human health effects of these toxins, recreation-specific exposure parameters from the peer-reviewed scientific literature and EPA's Exposure Factors Handbook using established criteria methodologies. EPA derived these recommended values based on children's recreational exposures because children can be more highly exposed compared to other age groups. The recommendations are also protective of older age groups.

- Methylmercury: EPA recommends the adoption of the CWA section 304(a) human health criterion of 0.3 mg/kg for methylmercury (measured in fish tissue). This value has undergone

extensive peer review by the U.S. National Academy of Sciences, National Research Council. In 2010, EPA also published companion implementation guidance to address issues associated with the water quality criterion and to facilitate implementation of the criterion in the total maximum daily load and permitting programs.

- Under the state's proposed antidegradation policy, the state will identify those waters where the water quality exceeds levels necessary to support the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water and for which such water quality will be "maintained and protected." EPA encourages LDEQ to identify the approach it will take when identifying these waters - parameter-by-parameter, waterbody-by-waterbody, or a hybrid of these two approaches. LDEQ has indicated that this decision requires further internal agency discussion. EPA remains available to assist efforts to address this question in future rulemakings or updates to the state's antidegradation implementation plan.

- LDEQ has long used the indicator fecal coliform and associated numeric criteria to protect primary contact recreation in freshwaters of the state. The EPA has discouraged the use of total and fecal coliforms as indicators of fecal contamination since 1986 because they are not reliable indicators of illness to swimmers. As far back as 1986, the EPA clearly stated the Agency's expectations for states to transition to indicators that are superior to fecal coliforms. In 1986 and again in 2012, the EPA, pursuant to Section 304(a) of the CWA, 33 U.S.C. § 1314(a), issued nationally recommended recreational water quality criteria (RWQC) to protect the public from exposure to harmful levels of pathogens while participating in primary contact recreation activities such as swimming. These recommended RWQC are based on two bacterial indicators of fecal contamination - *E. coli* or enterococci in fresh waters, and enterococci in marine waters. LDEQ updated its RWQC for coastal recreation waters in 2016 to reflect EPA's 2012 recommended RWQC, but has yet to update its RWQC for freshwaters. EPA notes that most states across the country have successfully made the transition to the recommended RWQC indicators and are now implementing these criteria in monitoring, assessment and permitting programs. EPA strongly recommends that LDEQ re-examine EPA's recommended freshwater RWQC for adoption. LDEQ may wish to consider phasing implementation across the state, beginning with the monitoring and assessment of *E. coli* and/or enterococcus in tandem with fecal coliform strictly in those waters where it is known that swimming activities occur frequently and by larger numbers of people, followed by a broadening of their application to other freshwaters of the state as comfort with the use of *E. coli* and enterococci in monitoring, assessment and permitting programs increases with time.

EPA looks forward to continued dialogue with the state with the goal of incorporating the most updated scientific information into state water quality standards.