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EPA Water Docket
Environmental Protection Agency
Mailcode: 2822-IT
1200 Pennsylvania Ave. NW.
Washington, DC 20460

By email only: ow-docket@epa.gov

**Re: EPA's Draft Aquatic Life Ambient Water Quality Criterion for
Selenium—Freshwater 2014**

Please accept these comments on behalf of Appalachian Mountain Advocates, Appalachian Voices, Kentuckians for the Commonwealth, Kentucky Waterways Alliance, Ohio Valley Environmental Coalition, Sierra Club, Southern Appalachian Mountain Stewards, West Virginia Highlands Conservancy, and the West Virginia Rivers Coalition (collectively “Commenters”).¹ Members of these organizations use and enjoy the water resources that could be affected by EPA’s Draft Aquatic Life Ambient Water Quality Criterion for Selenium—Freshwater 2014 (“Draft Criterion”) for a range of beneficial purposes, including uses involving aquatic life and aquatic-dependent wildlife. Commenters are greatly concerned about EPA’s Draft Aquatic Life Ambient Water Quality Criterion for Selenium, notice of which was provided in the Federal Register on May 14, 2014. These groups are very familiar with the dangers posed by selenium pollution, specifically selenium pollution from coal mines and related facilities in the central Appalachian region. Our organizations have been the primary drivers of enforcement of the existing selenium standards in the region, repeatedly overcoming efforts by industry and compliant state regulators to avoid and delay addressing the problem of selenium pollution. If EPA’s Draft Criterion—which gives primacy to fish-tissue concentrations² in determining compliance—is finalized and adopted by states in the region, we believe that citizen enforcement will be significantly undermined and that selenium pollution in the region will not be adequately addressed by the underfunded and industry-friendly state regulators.

Commenters are concerned not only that the Criterion is effectively unenforceable, but also that it contains serious scientific flaws that render it unprotective of sensitive aquatic life,

¹ These comments also incorporate by reference the separate comments submitted by Appalachian Voices on July 22, 2014.

² For ease of use, these comments refer to the whole body, muscle, and egg/ovary elements of EPA’s Draft Criterion as “fish tissue” elements.

aquatic-dependent wildlife, and endangered species. In order to develop criteria that are both practically applicable and fully protective of sensitive species, EPA must revise its fish tissue elements downward before translating them to enforceable water column criteria.

I. EPA Provided Inadequate Time to Provide Detailed, Meaningful Comments on Such a Complex, Lengthy Scientific Document

As an initial matter, the groups believe that, from the start, EPA should have provided more time for comments intended to inform external peer review of its Draft Criterion. The originally allotted 30-day comment period did not provide nearly enough time to fully evaluate and develop comprehensive, meaningful comments on a more than 600 page technical document. When presented with documents like EPA's Draft Criterion, citizen groups review the document, apply their own experience and expertise, and also seek input from recognized academic experts in the relevant field. Thirty days is not enough time to fully evaluate a lengthy technical document and solicit the views of experts, whose busy academic calendars leave them limited extra time to perform such outside reviews. When EPA put out a similar proposal regarding selenium in 2004—for which the technical support document was significantly shorter than the present document—the agency provided 120 days for the public to submit their scientific views on the criteria. Notice of Draft Aquatic Life Criteria for Selenium and Request for Scientific Information, Data, and Views, 69 Fed. Reg. 75, 541 (December 17, 2004). A proposal with such great potential to impact the health of aquatic life and wildlife communities across the country should not be rushed through the public review process. EPA must allow sufficient time for public review and input, particularly because EPA's proposal departs from the long-standing practice of using water column-based standards and instead adopts a novel, untested fish tissue-based approach.

We appreciate EPA granting an extension of the original 30-day comment period. However, EPA's provision of a very short initial comment period, followed by a 30-day extension that was not granted until the last day of that period, made for a disjointed and inadequate comment process. By not providing the longer comment period from the start, EPA made it difficult for commenters to solicit the views of academic and other experts in the field and include those views in their comments. By waiting until the last day of the original comment period to grant an extension, EPA effectively provided two separate 30-day periods, neither of which provided sufficient time to obtain expert analysis of EPA's proposal. Moreover, commenters believe that, even with the extension granted, the comment period did not provide sufficient time to adequately weigh in on the Draft Criterion's 600 page supporting document. In the future, commenters request that EPA provide at least 120 days for scientific review of such complex, technical proposals.

II. The Criterion Should Be Expressed As Practically Enforceable Water Column Elements

In passing the CWA, Congress recognized the fact that water quality standards – which existed prior to 1972 – would not, of themselves, protect and improve water quality. Accordingly, Congress established the National Pollutant Discharge Elimination System (NPDES), providing a mechanism for clear application and enforcement of water quality

standards. Further frustrated with a lack of progress in realizing the promise of narrative water quality goals, Congress again amended the Act in 1987, at that time requiring the development and application of numeric criteria for waterways affected by toxic pollutants. These revisions clearly illustrate Congress' intent to assure that water quality standards and goals are specific and translated into enforceable limitations on pollution sources.

Water quality criteria thus not only measure whether water bodies are meeting the uses mandated by the CWA, but also form the basis for establishing effective controls on water pollution to further the CWA's goal of "restor[ing] and maintain[ing] the chemical, physical and biological integrity of the nation's waters." See 33 U.S.C. § 1251(a). As EPA has recognized, water quality criteria must "serve the dual function of establishing water quality goals for a specific waterbody and providing the basis for regulatory controls." *EPA Water Quality Standards Handbook* at 4.6 (emphasis added). See also 40 C.F.R. § 130.3 (noting that water quality standards "serve the dual purposes of establishing the water quality goals for a specific water body and serving as the regulatory basis for establishment of water quality-based treatment controls and strategies"). Although a fish tissue-based criterion may be an accurate way to measure the threat posed by selenium in a waterbody (if the criterion is set at the appropriate level), it fails to provide the basis for effective regulatory action.

Based on the Commenters' extensive experience, the adoption by any central Appalachian state of a criterion that gives precedence to fish tissue elements will present obstacles to enforcement that undermine the dual function of water quality standards and will result in a lack of protection of the aquatic life in Appalachian streams, rivers, lakes and reservoirs. Because of a history of lax or non-existent enforcement by regulatory agencies in central Appalachia—particularly with regard to selenium pollution from coal mining operations—we strongly oppose the adoption of fish tissue criteria that are not translated to independently enforceable water column criteria. Indeed, the only reason that the serious problem of selenium pollution from coal mines is being addressed in the region at all is that citizens have been able to compel compliance with the existing water column criteria in permitting and enforcement actions. The state agencies have opposed and undermined those efforts at every step, consistently choosing delay and appeasement over meaningful regulation. Our experience enforcing the selenium standard in central Appalachia has taught us that the only way that coal operators and others in the region will be compelled to comply with selenium standards is if there is an enforceable water column number. We expect that this is true in many other areas of the country as well.

Indeed, in 2005, the USEPA/U.S. Department of Interior Tissue-based Criteria Subcommittee issued a draft report summarizing its opinions on aquatic life water quality standard guidelines. The report cautioned that fish tissue criteria alone would be insufficient to address "both scientific and regulatory needs concerning the relationship between chemical loadings and accumulated chemical residues in the tissues (i.e. bioaccumulation)." Science Advisory Board Consultation Document, Proposed Revisions to Aquatic Life Guidelines, Tissue-Based Criteria for "Bioaccumulative" Chemicals at 10.³ In the Subcommittee's opinion, there was a "need to develop guidelines for translating tissue-based aquatic life...criteria into

³ Available at

http://www.epa.gov/scipoly/sap/meetings/2008/october/aquatic_life_criteria_guidelines_tissue_08_26_05.pdf

corresponding concentrations in environmental media (e.g. water)...”Id. at 13. The Subcommittee subsequently listed “implementability” as a reason to develop fish-tissue-to-water-column translations, noting that “monitoring and enforcing pollutant discharge limits on the basis of measured chemical concentrations in tissues of organisms may not be practical or desirable...” Id. The central Appalachian states’ inability or unwillingness to enforce the existing, simple selenium water column criteria demonstrates the imprudence of adopting fish-tissue criteria that are significantly more difficult and costly to implement.

EPA has not explained how it and authorized state agencies would incorporate the proposed fish-tissue elements into enforceable measures needed for NPDES permit limits, TMDLs, and other pollution control decisions required by the Clean Water Act. EPA’s proposal leaves unanswered fundamental questions about how the fish-tissue elements are to be used when issuing NPDES permits. For instance, how are regulators to determine the “reasonable potential” for a proposed new discharge to cause or contribute to violations of the fish tissue elements? How will appropriate “end of pipe” effluent limits be determined? If there is a “reasonable potential,” when must treatment start? Without clear guidance from EPA, we fear that states will adopt and EPA will be forced to approve standards that cannot practically be used to set necessary water quality-based permit limits. Our experience has shown that underfunded and/or industry-friendly state regulators will only impose enforceable permit limits when they are forced to do so by clear standards and incontrovertible evidence of reasonable potential. A recommended criterion that does not explicitly establish when permit limits must be imposed but instead injects considerable uncertainty into the reasonable potential analysis invites regulators to acquiesce to industry pressure to impose no limits or limits that are effectively meaningless.

Likewise, EPA’s proposal lacks necessary information regarding how compliance with the fish-tissue elements should be determined for the purpose of enforcing NPDES permit limits, evaluating waters for impairment, and developing and enforcing TMDLs. For instance, if a permittee receives a fish tissue-based NPDES permit limit, where must sampling of fish occur in relation to the discharge? How many fish must be collected to provide a representative sample? How often and at what stages of life must sampling take place? What fish taxa will be used to determine compliance? How will regulators account for variation and individual differences and toxicity within taxa depending on, among other things, age, individual diet, areas of forage, and duration of stay in polluted waters? If adequate numbers of fish are indeed collected, what impact will this have on fish populations that may already be pressured by selenium and other pollution? How will regulators ensure that endangered species are protected by sampling protocols such that illegal “take” is avoided? How will impairment be detected in waters where sensitive species that rapidly accumulate selenium have already been extirpated?

EPA has not shown that compliance with the fish tissue elements can accurately be determined in most circumstances. This is particularly problematic in small headwater streams that directly receive much of the selenium pollution from coal mines in Appalachia. These streams often lack sufficient fish populations for a truly representative sample to be collected, and downstream reaches with larger fish populations often receive discharges from many different sources such that responsibility for violations of the standard will be extremely difficult to assign. Moreover, if a “species-composite” method is used to determine compliance with a fish-tissue element, wherein the tissue of all fish collected is combined for analysis, it is likely to

miss impairment of sensitive species that accumulate selenium more rapidly. In sum, regulators who are under heavy pressure from industry and whose resources are already stretched far too thin are unlikely to develop and implement the complex, expensive fish sampling and testing protocols necessary to obtain representative samples to determine a waterbody's compliance with the fish-tissue elements, to the extent that such protocols are even possible to develop.

Instead of relying on fish tissue standards that present critical implementation problems, EPA should adopt clearly enforceable water column criteria. EPA's Draft Criterion document recognizes that the dietary pathway of selenium accumulation can still be accounted for in water column criteria. Using the methods developed by the EPA and the United States Geological Survey, protective fish tissue concentrations can be translated to practically enforceable water column criteria. Draft Criterion at 62. The model developed by USGS recognizes that diet is the primary pathway of exposure for selenium and creates a simple, direct linkage between dissolved selenium in the water column and selenium toxicity to aquatic life. EPA's Draft Criterion document explains that the expected and measured relationships between egg-ovary concentrations and water column concentrations are "highly correlated."⁴ Draft Criterion at 134. An inviolable water column criterion that is based on fish tissue concentrations is therefore scientifically defensible because it recognizes and accounts for the fact that diet is the primary pathway for selenium uptake.

The Draft Criterion's inclusion of water column based elements in no way corrects this fundamental flaw. EPA has explicitly stated that the fish tissue elements should be given primacy over the water column elements. Draft Criterion at 4-5. That statement essentially eliminates any benefits from including water column elements. The better approach would be to adopt only a translated water column criterion and to eliminate the fish tissue elements.

Not only is a translated water column criterion scientifically defensible, it is also vastly more useful as a regulatory tool. Most states have specific, federally-approved procedures for how to convert water column criteria to enforceable restrictions on wastewater discharges, in addition to the technical guidance, training and other materials on scientifically valid models, necessary background data, sampling protocols, and acceptable laboratory techniques for the implementation of traditional water column criteria that EPA has provided. Water column criteria also can be more easily enforced by citizens with limited resources when state regulators fail to uphold their duties. Enforcing the proposed fish-tissue elements, in contrast, will require a case-by-case analysis of the local ecosystem, including collection, processing, and testing of fish tissue, all of which will require significant resources and inject considerable uncertainty. Thus, in order to achieve the dual purposes of water quality criteria, EPA should adopt as its Recommended Criteria a set of water column criteria that are translated from protective fish-tissue concentrations.⁵

⁴ EPA could create an even more robust water column criterion by collecting additional data correlating fish-tissue concentrations to water column concentrations. See Draft Criterion at 135 (explaining that minor variability in correlation could be due in part to small sample size). Regardless, the uncertainty in translating protective fish tissue values to water column numbers is likely far outweighed by the uncertainty in determining compliance with the fish tissue elements in the absence of robust tissue sampling protocols.

⁵ As explained below, the fish tissue elements of EPA's Draft Criterion are too high to protect sensitive aquatic life and should be revised downward significantly. The water column criteria should be based on fish tissue concentrations that are revised to ensure protection of such species.

III. The Chronic Water Column Element Should Be Expressed as a Four-Day Average

As explained above, an inviolable water column criterion is necessary to achieve the dual purposes of setting water quality goals and providing the basis for effective regulatory controls. While we believe that EPA must give precedence to the water column elements of its Draft Criterion, those elements must be revised to ensure that they can be practically enforced and implemented. The Draft Criterion includes, as one of its four elements, a “Monthly Average” water column element that is based on the “30-day average water concentration.” Draft Criterion at 4, 8. This 30-day average replaces the existing criterion for chronic exposure, which is expressed as a “four-day average.” See 64 Fed. Reg 61,182 at 61,194-61,195. By shifting from a four-day to a 30-day average, EPA has removed important protections for aquatic life. EPA has not explained the basis for its shift from a four-day to a 30-day average. This shift and the lack of explanation are particularly problematic because multiple EPA guidance documents explicitly state that four-day averaging periods are preferred while 30-day averaging periods should be discouraged. The documents that support a four-day averaging period include EPA’s “*Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985)”⁶ and “*Technical Support Document For Water Quality-based Toxics Control* (1991).”⁷ In its final selenium criterion, EPA should return to the use of a four-day average.

A. EPA’s Use of a 30-day Average is Inconsistent with EPA Guidance

One of the documents that supports a four-day average over a 30-day average was directly relied on by EPA in preparing the proposed selenium criterion. EPA’s public notice states that the proposed selenium criterion is “based on the latest scientific information and current EPA policies and methods, including EPA’s *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985) (EPA/ R–85–100).” 79 Fed. Reg at 27,602. Despite this apparent reliance, EPA has ignored the *Guidelines*’ express statement that a four-day average is more protective than, and therefore preferable to, a thirty-day average.

The *Guidelines* first observes that the averaging period should be shorter than the test used to derive the criteria, stating that “Life-cycle tests with species such as mysids and daphnids and early life-stage tests with warmwater fishes usually last for 20 to 30 days. An averaging period that is equal to the length of the test will obviously allow the worst possible fluctuations and would very likely allow increased adverse effects.” *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985) at 5.

The Guidance then expands on the benefits of a four-day averaging period:

⁶ Available at: <http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/upload/85guidelines.pdf>

⁷ Available at: <http://www.epa.gov/npdes/pubs/owm0264.pdf>

An averaging period of four days seems appropriate for use with the CCC [criterion continuous concentration] for two reasons. First, it is substantially shorter than the 20 to 30 days that is obviously unacceptable. Second, for some species it appears that the results of chronic tests are due to the existence of a sensitive life stage at some time during the test, rather than being caused by either long-term stress or long-term accumulation of the test material in the organism. The existence of a sensitive life stage is probably the cause of acute-chronic ratios that are not much greater than 1, and is also possible when the ratio is substantially greater than 1. In addition, some experimentally determined acute-chronic ratios are somewhat less than 1, possibly because prior exposure during the chronic test increased the resistance of the sensitive life stage. A four-day averaging period will probably prevent increased adverse effects on sensitive life stages by limiting the durations and magnitudes of exceedences of the CCC.

Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses (1985) at 5.

The *Guidance* upon which the proposed selenium criterion is supposedly “based on” thus recognizes that an averaging period of 30-days “is obviously unacceptable” and recommends instead an averaging period of four-days.

Other EPA publications also recommend the use of a four-day average. The “*Technical Support Document For Water Quality-based Toxics Control* (1991)” states that “a 4-day averaging period is recommended for application of the CCC in aquatic-life criteria for both individual pollutants and Whole Effluents.” *Technical Support Document* at Appendix D-2. Just as the *Guidelines* did, the *Technical Support Document* makes clear that the “averaging period should be substantially less than the lengths of the tests” on which it is based. *Id.* at Appendix D-3. The chronic exposure tests cited by EPA in its Draft Criterion document include studies of 30 or fewer days. *See e.g.* Draft Criterion at 44 (describing a 28-day study of “fry surviving at swim-up”); 48 (“the 30-day larval survival test”). Because these tests were as little as 30 days, the averaging period should be substantially shorter.

The *Technical Support Document* provides several additional reasons why a four-day averaging period is recommended:

- It is substantially shorter than the 20- to 30-day duration of most chronic tests and is somewhat shorter than the 7-day duration of the *Ceriodaphnia* life-cycle test.
- For both endrin and fenvalerate, Jarvinen et al. found that a 72-hour exposure caused about the same amount of effect on the growth of fathead minnows in early life-stage tests as did a 30-day exposure to the same concentration.
- In some life-cycle tests on effluents with Ceriodaphnids, concentrations of effluents that were a factor of 1.8 greater than the CCC caused unacceptable effects in 4 or 5 days.
- It is not so short as to effectively defeat the purpose of the concept of the averaging period.

Id. at Appendix D-2 (internal citations omitted).

B. EPA's Use of a 30-day Average Will Render the Water-Column Element Unenforceable

The use of a 30-day average will also fail to adequately protect aquatic life because it will render the water-column based chronic element unenforceable. As EPA has provided no explanation as to how the 30-day average is to be implemented, courts and state regulators are free to interpret the element as they see fit. At least one federal judge has interpreted a four-day average as requiring four consecutive days of sampling. Such an interpretation applied to a 30-day standard would make it impossible for citizen groups to monitor compliance with a selenium water quality standard and would greatly increase the cost to states of determining compliance with the standard.

In a Clean Water Act citizen suit enforcing a permit condition that forbade violations of water quality standards, a West Virginia federal district court acknowledged that the citizen plaintiffs had presented selenium monitoring data in which “some months have two days of measurements per location, [and] other months have only one day.” *Ohio Valley Environmental Coalition, Inc. v. Consol of Kentucky, Inc.*, 2014 WL 1761938 at *16 (S.D.W.Va., 2014). Although the court acknowledged that “every measurement reported exceeds [the existing chronic criterion of] 5 ug/l,” it concluded that “it is not clear that any of these measurements are actually *chronic* measurements, that is, four-day average concentrations.” *Id.* The implication of the district court’s decision is that four consecutive days of sampling data are required to prove a violation of a standard expressed as a four-day average. The further implication is that a thirty-day average would require thirty consecutive days of sampling data. Such a requirement would be logistically complicated to the point of impracticality, and would be prohibitively expensive given the costs of the sampler’s time and the laboratory fees for each sample. This would thwart enforcement in the not-uncommon situation where regulators have not imposed end of pipe numerical effluent limitations but rather rely on general permit conditions that prohibit violation of water quality standards.

C. EPA Must At Least Clarify How the 30-day Average is to be Implemented and Enforced

As explained in the *Guidelines and Technical Support Document*, the water-column based element should be expressed as a four-day average. If EPA does not intend to utilize a four-day average, but does intend to allow the 30-day average to be implemented and enforced based on less than 30 days of data, EPA must at least clarify that. For example, if EPA intended that the 30-day average be implemented as a monthly average, EPA should state that directly, and should reference 40 C.F.R. § 122.2, which defines “average monthly discharge limitation” as “the highest allowable average of ‘daily discharges’ over a calendar month, calculated as the sum of all ‘daily discharges’ measured during a calendar month divided by the number of ‘daily discharges’ measured during that month.” In other words, EPA should clarify that compliance can be determined based on less than 30 samples taken within a given month.

IV. The Intermittent Exposure Water Column Element Needs Clarification

In order to address the cumulative, chronic effects of shorter-term pulses of selenium pollution, EPA included an intermittent exposure water concentration element in its Draft Criterion. Draft Criterion at 92. Compliance with this element is determined using an equation that involves the concentration of selenium during pulse events as well as the “average background selenium concentration” during the rest of the 30-day measurement period. Although the Commenters generally agree with such an approach at this time, the element as proposed suffers from similar implementation problems as the monthly average element. In particular, the data necessary to determine the “background concentration” term of the intermittent exposure element equation will be lacking in most circumstances. As explained above, thirty consecutive days of water column data are rarely available to either citizens or regulators, such that, even where data exists to show high pulses of selenium, compliance with the intermittent exposure element cannot be easily determined. EPA should make clear that citizens and regulators may extrapolate from more limited data to determine the “background exposure” occurring during the non-pulse days of the 30-day period.

V. The Concentrations of the Fish Tissue Elements Are Too High to Protect Sensitive Species

As stated above, the thirty day peer review period did not give Commenters adequate time to solicit and obtain the opinions of academic experts in the field of selenium toxicity on the technical aspects of EPA’s Draft Criteria. However, Commenters provide their initial observations of flaws in EPA’s criterion development process that render the fish tissue-based elements insufficiently protective of sensitive species.⁸

EPA’s *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses* (1985) explain that water quality criteria should fully protect sensitive species that are “commercially or recreationally important.” EPA derived its egg/ovary element, which forms the basis for its other fish tissue elements, by averaging the genus mean chronic values for what it claims are the four most sensitive genera for which adequate data exist. The resulting fish tissue elements are not adequate to protect certain sensitive species that are commercially and recreationally important, such as species of bluegill and catfish.

In a letter to EPA expressing concern over the egg/ovary criterion in EPA’s 2010 draft proposal, selenium expert Dr. Dennis Lemly of the USDA Forest Service concluded that EPA’s inclusion of more tolerant species in the criterion evaluation and development resulted in a proposed criterion that would have allowed mortality to exceed allowable limits in more sensitive species. Dr. Lemly stated that scientific studies show:

quite clearly that a criterion of 17.07 mg/kg for fish eggs/ovaries will jeopardize two of the most important freshwater fish families in North America: Centrarchidae and Ictaluridae. For example, (1) An EPA field study published in

⁸ Commenters incorporate by reference into this section the critiques and accompanying authority on pages 3–4 of Appalachian Voices July 22, 2014 comments.

the peer reviewed journal *Environmental Toxicology and Chemistry* (Hermanutz et al 1992) found that ovary selenium concentrations of 9 mg/kg dw or greater resulted in 40% higher mortality and 80% more edema in larval bluegill sunfish that controls for an EC40-80 (converted from wet weight using 80% moisture, based on mean wet weight +/- one standard deviation). The results of this study are not included in EPA's draft criterion calculation, and (2) A laboratory study at the University of California (Doroshov et al. 1992) found that the EC50 for larval mortality of channel catfish and bluegill sunfish occurred at egg selenium concentrations of 7.2 and 15.0 mg/kg dw respectively (lower limit of 95% confidence intervals). These mortality data were not included in the data used to derive the FCV.

...

Extensive field data from the Belews Lake case example, which includes reproductive analysis from young-of-the-year stock assessment, clearly show that catfish are very sensitive selenium poisoning in a real-world setting. . .equal to or greater than sunfish (Cumbie 1978, Cumbie and Van Haron 1978, Holland 1979, Garrett and Inman 1984, Lemly 1985). . . .

The FCV needs to be lower than 10 mg/kg dw in order to protect sunfish and catfish at an EC10 level, which is the level of protection afforded to trout by the 17.07 draft criterion value.

Letter to Mr. Joseph Beaman, Chief, USEPA, Office of Water, Ecological Risk Assessment Branch, Washington, DC from A. Dennis Lemly, Ph.D., Research Fish Biologist, USDA Forest Service, Southern Research Station, Piedmont Aquatic Research Laboratory, July 6, 2010 at 1-3 (emphasis added). Clearly, EPA's proposed egg/ovary element of 15.2 mg/kg would not protect those species at the EC10 level that EPA has used to derive its current proposed criterion.

In addition to improperly averaging values across genera, EPA failed to adequately account for "winter stress" in sensitive bluegill species. As EPA recognized in its Draft Criterion document, a study by Dr. Lemly found the protective chronic selenium whole body concentration for juvenile bluegill to be 5.85 mg/kg prior to winter stress. Instead of using this protective value for the bluegill's genus mean chronic value, EPA averaged it with the values from McIntyre et al.'s 2008 study, which also purported to account for winter stress, but arrived at a much less protective concentration of over 9 mg/kg. Draft Criterion at 122-23. Reliance on the McIntyre study to account for selenium is misplaced, however, because that study failed to actually induce winter stress, in part, because it did not control photoperiod or discuss the impacts that the lack of photoperiod controls may have on the interpretation of study results. EPA must fully account for winter stress, using studies that actually induce such stress by recreating realistic winter conditions including reduced photoperiod, when revising its fish tissue concentrations to ensure protection of sensitive aquatic species.

VI. The Criterion Must Protect Aquatic-Dependent Wildlife

The Clean Water Act mandates that water quality standards protect not only fish, but all aquatic organisms and other wildlife that depend on healthy streams. Section 303(c) requires that such standards "shall be established taking into consideration their use and value for . . .

propagation of fish and wildlife,” among other things. 33 U.S.C. § 1313(c)(2)(A) (emphasis added); see also 33 U.S.C. § 1252(a) (directing states to develop comprehensive programs for controlling water pollution giving due regard to improvements necessary to “conserve such waters for the protection and propagation of fish and aquatic life and wildlife”). EPA’s regulations require states to develop standards that will “[s]erve the purposes of the Act,” meaning that they will “provide water quality for the protection and propagation of fish, shellfish and wildlife,” among other things. 40 C.F.R. § 130.3 (emphasis added). Commenters are not aware of any states that have adopted selenium water quality standards specifically for the protection of aquatic-dependent wildlife and EPA does not have a Recommended Criteria for selenium to protect aquatic-dependent wildlife. In the absence of any standards that address wildlife, an approach that focusses solely on aquatic life does not satisfy the requirements of the CWA because it leaves such wildlife without any protection under the Act from selenium pollution.

Although EPA did not analyze the impacts of its criterion on aquatic-dependent wildlife, existing evidence makes clear that the concentrations of the proposed fish tissue elements are not protective of aquatic dependent wildlife. In 2004, EPA proposed but did not adopt recommended criteria that included a whole-body fish tissue criterion of 7.91 µg/l, which is more protective than EPA’s current proposal. See Notice of Draft Aquatic Life Criteria for Selenium and Request for Scientific Information, Data, and Views, 69 Fed. Reg. 75, 541 (December 17, 2004). A group of the nation’s leading selenium scientists wrote a white paper vigorously criticizing that criterion as not protective and too high. The authors explained the history of the EPA’s flawed number:

During the past 17 years numerous researchers including those funded by EPA have estimated that the toxicity threshold for selenium lies below the current chronic aquatic life criterion of 5 µg/L. Recently, corporate interests have claimed that 5 µg/L is overly restrictive. Because of an endangered species issue in California, EPA agreed to re-evaluate their CWA criteria guidance for selenium by 2002. This was problematic because:

- EPA’s normal procedure for setting Aquatic Life Criteria does not directly consider toxicity data for aquatic-dependent wildlife
- EPA has promulgated no separate wildlife criteria for selenium.
- EPA’s normal procedure for setting criteria is better suited to non-bioaccumulative pollutants – selenium is bioaccumulative.
- ESA-listed species every individual of a population “counts” and therefore criteria guidance would need to be fully protective at an individual-effects level.

EPA contracted with the Great Lakes Environmental Center (GLEC) to derive the new selenium criteria. GLEC was instructed to derive the chronic criterion on a fish-tissue basis rather than on a water concentration basis. The GLEC derived criterion was released in March 2002. The draft tissue-based chronic criterion, of 7.9 µg/g, dry weight basis, assumed 20% of the target population would die. The USFWS asked EPA to not promulgate the criterion because it wasn’t protective of endangered species.

Joseph P. Skorupa, USFWS, Theresa S. Presser, USGS, Steven J. Hamilton, USGS, A. Dennis Lemly, USFS, Brad E. Sample, CH2M HILL, EPA's Draft Tissue-Based Selenium Criterion: A Technical Review. Spring 2004. at 2-3.

The authors noted significant additional flaws in EPA's proposed criterion that would lead to harm to wildlife, including threatened and endangered species:

GLEC's assessment of risk to aquatic-dependent wildlife was based on an erroneous draft wildlife toxicology report. The draft tissue-based chronic criterion for selenium of 7.9 µg/g would leave a substantive proportion of aquatic-dependent wildlife species unprotected; on the order of half the species. Aquatic life criteria are considered by EPA to be separate and distinct from wildlife criteria. Nonetheless, in the absence of promulgated wildlife criteria (as is the case for selenium), if the aquatic life criteria do not protect wildlife the purposes of the CWA are not being met. More critically, for waters of the United States supporting ESA-listed aquatic-dependent wildlife, the criteria would not be approvable for incorporation into state or tribal water quality standards.

Id. Those experts estimated that EPA's previously proposed criterion would have caused reproductive impairment in, conservatively, 40% and possibly as high as 95% of exposed mallard ducks. See Lemly, A. Dennis, Assessing the toxic threat of selenium to fish and aquatic birds, Environmental Monitoring and Assessment 43: 19-35 (1996). Reproductive impairment occurs if ducks are exposed through a contaminated diet during the development of their chicks. Mallard ducks are ubiquitous, breeding near and relying on aquatic resources throughout the US. They are primarily vegetarians eating seeds of grasses and sedges and the leaves, stems and seeds of aquatic plants. They occasionally eat insects, crustaceans and mollusks, especially when they are young. See <http://www.nhptv.org/natureworks/mallard.htm>. While the ducks do not eat fish, "allowing fish tissue to reach 7.9 ug/g would allow a level of contamination in the other parts of the aquatic ecosystem sufficient to cause nearly total reproductive failure among mallard ducks." Skorupa et al. at 22. The US Fish and Wildlife Service has stated that a protective fish tissue standard for water birds would be 5 µg/g selenium, much lower than EPA's proposed whole body element of 8.1 mg/kg. See, e.g., Letter from Virgil Lee Andrews, USFWS Kentucky Field Office Supervisor to Annie Godfrey, Chief of USEPA Water Quality Standards Section, December 27, 2013. EPA thus must either revise its fish tissue elements to ensure that they protect aquatic-dependent wildlife or else issue a concurrent wildlife criterion that must be adopted along with EPA's recommended aquatic life criterion.

VII. The Criterion Must Protect All Threatened or Endangered Species

Water quality standards must protect all existing uses in a waterbody, which uses often include supporting species that are listed as threatened or endangered pursuant to the Endangered Species Act. See 33 U.S.C. § 1313. Additionally, Section 7 of the Endangered Species Act and its implementing regulations require each federal agency, in consultation with the appropriate wildlife agency, to insure that any action authorized, funded, or carried out by the agency is not likely to (1) jeopardize the continued existence of any threatened or endangered species or (2) result in the destruction or adverse modification of the critical habitat of such species. 16 U.S.C.

§ 1536(a)(2); 50 C.F.R. § 402.14(a). EPA thus must ensure that any criteria that it recommends states to adopt will be fully protective of listed species.

EPA's Draft Criterion document concludes that it will protect threatened and endangered species based off analysis of only two listed species and two additional species that are closely related to listed species. USFWS records show that there are currently 154 fish species in the US that are listed as threatened or endangered pursuant to the Endangered Species Act. See USFWS, Environmental Conservation Online System, Summary of Listed Species.⁹ EPA cannot safely assume that the two listed species and two closely related species are good proxies for every single endangered species in the country that could be exposed to selenium pollution. Indeed, EPA recognizes that "because other threatened or endangered species might be more sensitive, if relevant new information becomes available in the future, it should be considered in state- or site-specific criteria calculations." Draft Criterion at 139–40. Instead of putting off protection of sensitive endangered species to later state or site-specific standard setting, EPA must revise its criterion to ensure protection of all endangered species. It is not sufficient to say that the agency lacks information. Rather, in the absence of additional data regarding selenium-sensitive listed species, EPA must apply a substantial safety factor to its criterion to ensure protection of such species.

Moreover, as USFWS has noted to EPA, use of the EC10 effect level that EPA has employed here, see Draft Criterion at 25–26, is inappropriate for water quality criteria that apply to listed species. When dealing with listed species, every individual is important. An EC10 effects level assumes that one out of every ten individuals will suffer adverse effects. That is unacceptable for listed species. In order to ensure that endangered species are protected, EPA must initiate and complete consultation with the USFWS pursuant to Section 7 of the ESA prior to finalizing any recommended aquatic life criteria for selenium.

CONCLUSION

For the foregoing reasons, EPA must significantly reduce the concentrations allowed under its fish tissue elements to ensure they are protective of sensitive species, aquatic-dependent wildlife, and threatened and endangered species. EPA must then translate those revised tissue concentrations to enforceable water column criteria that can be practically implemented to achieve the regulatory requirements of the Clean Water Act.

Sincerely,



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⁹Available at http://ecos.fws.gov/tess_public/pub/Boxscore.do. That is in addition to the 35 listed amphibian species, 25 listed crustacean species, and 88 listed clam species.

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A handwritten signature in black ink, appearing to read "Peter Morgan", with a long horizontal flourish extending to the right.

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