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May 24, 2017

**Comments on the First External Review Draft Integrated Science Assessment for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter—Ecological Criteria (EPA/600/R-16/372)  
Docket ID No. EPA-HQ-ORD-2013-0620 and Docket ID No. EPA-HQ-OAR-2014-0128  
Emailed to Docket\_ORD@epa.gov**

Appalachian Mountain Club, National Parks Conservation Association, and Center for Biological Diversity submit the following comments on the First External Review Draft Integrated Science Assessment for Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter—Ecological Criteria (EPA/600/R-16/372).

The ecological impacts from legacy and ongoing sulfur and nitrogen deposition are of great concern to the undersigned organizations' members and supporters. Deleterious impacts from sulfur and nitrogen deposition are widespread across land and water ecosystems and include both direct exposure (e.g. soil acidification; nitrogen enrichment) and biological effects (e.g. decreases in biodiversity; fish declines; increasing the bioavailability of mercury). These harms affect the public welfare in countless ways, damaging the ability of ecosystems to clean our air and water and to provide us with the basic natural resources we rely on for food, shelter, and material goods.

While other Clean Air Act (CAA) programs that address source emissions of sulfur and nitrogen have made significant progress, these pollutants are still being emitted and deposited at levels that cause ecological damage. The CAA requires National Ambient Air Quality Standards (NAAQS) to be set at levels requisite to protect the public health and the public welfare and reviewed every five years based on the latest body of science. The science-based review of the secondary NAAQS Oxides of Nitrogen, Oxides of Sulfur, and Particulate Matter—Ecological Criteria must be specific to welfare impacts.

This current document provides the basis to move forward with stronger standards. These welfare standards are extremely important to protecting unique and sensitive public lands including National Parks and Forests. The case studies included in the assessment clearly identify specific ongoing impacts to highly valued natural resources and landscapes. These include, but are not limited to, southeastern Appalachia and the Great Smoky Mountains National Park, where acidification is still occurring despite SO<sub>2</sub> reductions; the Rocky Mountain National Park where impacts of excess nitrogen have altered biodiversity; and Arid and Semi-

Arid Ecosystems where nitrogen deposition impacts to coastal sage scrub ecosystems have resulted in increased invasive species leading to increased fire risk. If these places, and the ecological diversity they provide, are not protected through this rulemaking, protections against public welfare impacts will not be directly addressed, and the ongoing adverse impacts to these protected places identified in the draft ISA will continue.

The current ISA builds upon decades of clear science identifying the impacts of NO<sub>x</sub>, SO<sub>x</sub> and PM on many different terrestrial and aquatic systems. As with past NAAQS reviews there is a framework for evaluating evidence and making conclusions and causal judgments about the impacts of the pollutants on the ecological systems considered. The new scientific literature considered in this current draft ISA reinforces the 2008 ISA findings of 14 different causal relationships between the criteria pollutants and the ecological effects (3 gas-phase phototoxic effects, 6 N and acidifying deposition to terrestrial and freshwater ecosystems, 4 N deposition to estuarine and wetland ecosystems, and 1 S deposition to wetland and freshwater ecosystems). Five new effects have also been added (2 N and acidifying deposition to terrestrial ecosystems, 2 N deposition to estuarine ecosystems and 1 S deposition to wetland and freshwater ecosystems), based on solid new scientific findings. We support the inclusion of these effects and relationships in the ISA.

The effect of N and S deposition on biodiversity is especially concerning as biodiversity is directly related to ecosystem stability. As ecosystems deteriorate they lose their capacity to provide ecosystem services, or the services performed by ecosystems that benefit human welfare and society, e.g. providing cleaner water and air, food, lumber, cultural meaning; etc. This ISA includes recent science regarding the frameworks for and classification of ecosystem services, including studies that specifically evaluate the effects of N and S deposition on vulnerable species such as the Balsam Fir, commonly used as Christmas trees. We support the inclusion of these frameworks as they help highlight the many everyday ways our world and experience are affected by N and S pollution.

Any remaining uncertainties in the comprehensive scientific review presented in the ISA are well within usual scientific bounds for reasoned decision-making. The science presented in this ISA clearly indicates the need to set a new, specific standard addressing the full range of adverse effects causally related to these pollutants rather than retaining the current NO<sub>2</sub> and SO<sub>2</sub> secondary standard, which was set equivalent to the health-based standard nearly 50 years ago, and addresses only phytotoxicity. Any previously existing gaps in data or methodology have largely been addressed through years of scientific advancement in monitoring, analysis, and modeling. Given that this is an area of continued research, and that such research will lead to an even stronger set of science on which to base any policy decisions, we ask that EPA update the final version of this ISA to include the most recent science available from 2016-2017.

We also strongly support including particulate matter in this assessment of the ecological effects of sulfur and nitrogen deposition. Particulate phase nitrogen and sulfur compounds, largely derived from gaseous N and S emissions, contribute to total N and S deposition and have

their own unique effects not fully considered in prior reviews. By combining PM with NOx and SOx in one assessment EPA can more effectively protect the public welfare as impacted by N and S deposition.

We support the use of critical loads as an organizing principle to relate atmospheric deposition to ecological impacts. The basis of critical loads has been developed over many years and was included in the 2008 ISA. EPA defines the critical load of atmospheric pollutant deposition as a level of a pollutant below which there is no harmful ecological effect on a particular ecosystem element. It is expected that there will be multiple critical loads specific to different ecosystem impacts.

In conclusion, our organizations believe this ISA clearly characterizes the overwhelming evidence that N and S deposition have negative ecological impacts across many different biomes, influencing a wide range of human activities and natural processes, and therefore harm public welfare. We support this important process moving forward, beginning with CASAC review, and we look forward to further opportunities for public comment as this science base foundation is finalized and the current welfare-based NAAQS is assessed.

Sincerely,

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