United States Department of the Interior

NATIONAL PARK SERVICE
Air Resources Division
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IN REPLY REFER TO:

March 26, 2010

N3615 (2350)

Ms. Kyndall Barry
Science Advisory Board
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Dear Ms. Barry:

The National Park Service is pleased to comment on the U.S. Environmental Protection Agency's (EPA's) *Review of the Secondary National Ambient Air Quality Standards for NOx and SOx: First Draft Policy Assessment of Scientific and Technical Information.*

NPS supports EPA's proposed framework for a secondary NAAQS for nitrogen oxides (NOx) and sulfur oxides (SOx). Through the Integrated Science Assessment (ISA) and the Risk and Exposure Assessment (REA), EPA has demonstrated the quantitative relationships between atmospheric concentrations of NOx and SOx, deposition of nitrogen and sulfur, and adverse ecological impacts.

We agree with EPA that the data for proposing a secondary standard for NOx and SOx are most complete for aquatic acidification. We concur that Acid Neutralizing Capacity (ANC) is the most appropriate ecological indicator for aquatic acidification and that the ratio of base cations to aluminum in soils is an appropriate indicator for terrestrial acidification.

We caution EPA that is it important to repeatedly emphasize in the Policy Assessment that a standard proposed for aquatic acidification is not likely to protect streams, lakes, and terrestrial ecosystems that are nitrogen-limited. In particular, as discussed in the REA, nitrogen-limited western alpine lakes and sensitive terrestrial ecosystems respond to levels of nitrogen deposition well below the levels that would cause acidification in these systems. Because we are concerned that the public may not understand that acidification-based secondary standards will not be protective of such ecosystems, we encourage EPA to move promptly to propose appropriate secondary standards to protect these ecosystems, based on currently available critical loads.

We also encourage EPA to address coastal eutrophication due to atmospheric nitrogen deposition. While atmospheric deposition is only one of several contributors to nitrogen loading

in coastal estuaries, it is important to reduce atmospheric contributions to improve the viability of these systems.

We support EPA's proposed framework for the secondary standard for aquatic acidification that:

- Considers the collective impacts of NOx and SOx and addresses the contribution of reduced nitrogen;
- Links an ecological indicator (e.g., ANC) of an ecosystem response (e.g., reduced fitness and diversity of fish populations) to a deposition metric (e.g., total deposition of NOx/SOx);
- Accounts for factors that modify ecosystem sensitivity (e.g., base cation weathering);
- Links deposition to atmospheric concentrations of NOx and SOx (e.g., deposition velocity); and,
- Accounts for factors that modify atmospheric deposition (e.g., meteorology, land surface).

This ecologically-relevant approach is preferred over the existing separate secondary standards for nitrogen dioxide and sulfur oxides that are based on atmospheric concentrations and consider only direct effects to vegetation. The ISA and REA provide abundant evidence that adverse ecological impacts are occurring at current levels of the secondary standards and that these levels are not protective of welfare effects.

EPA is considering three levels of protection for aquatic acidification: ANC values of 20, 50, or 100 microequivalents per liter (μeq/l). We encourage the EPA Administrator to select an ANC of 100 μeq/l to protect against adverse impacts to fitness and diversity of fish populations and to protect against episodic acidification events. The ISA and REA clearly show that biota are generally not harmed at ANC values greater than 100 μeq/l, whereas at ANC values below 100 μeq/l, fish fitness and community diversity begin to decline.

We agree that bedrock geology is a good indicator of the potential for base cation weathering to neutralize incoming acids and therefore a good indicator of surface water ANC. However, in some areas of the country base cation weathering estimates are somewhat coarse. We encourage EPA to continue to explore ways to improve methods to derive base cation weathering estimates.

EPA proposes to use an Atmospheric Acidification Potential Index (AAPI) as the basis of the secondary standards. The AAPI would describe the potential of an ecosystem to become acidified from atmospheric deposition, and includes deposition, background ANC, and other parameters that influence sensitivity. An AAPI value would be equivalent to an ANC value, i.e., an AAPI of 100 would be equivalent to an ANC of 100 μeq/l. If the Administrator determines that an ANC of 100 μeq/l would protect most acid-sensitive ecosystems, the target AAPI would be 100. Current values for AAPI would be calculated for all areas of the country and compared to the target AAPI. If the current AAPI exceeded the target AAPI, calculations could be made to determine what combinations of NOx and SOx concentrations would meet the target AAPI.

Because this is a new approach, we recommend that EPA use one of the case studies to show how the current AAPI would be calculated and how concentrations for NOx and SOx would be calculated to meet the target AAPI. In addition, we ask EPA to provide more information on the

geographic scale used to define the AAPI for an area. As noted in the REA, areas limited geographically (e.g., mountain ridgetops, high elevation streams) may differ significantly in terms of acid sensitivity from nearby areas. Protective standards must accommodate these fine-scale differences and provide requisite protection for the most sensitive areas.

In the AAPI, EPA separates total atmospheric nitrogen species into two categories: oxidized nitrogen and reduced nitrogen species. Total oxidized nitrogen is referred to as NOy and includes nitrogen oxide (NO) plus nitrogen dioxide (NO_2) which are collectively referred to as nitrogen oxides (NOx), plus all other oxidized nitrogen species, including both gases and particles, which contribute to nitrogen deposition. Reduced nitrogen (N) species include ammonia, NH_3, and ammonium, NH_4. EPA has not clearly defined how the contribution of reduced nitrogen to total deposition will be accounted for in the AAPI. Reduced N is a significant fraction of total acidifying deposition. If this contribution is excluded in the AAPI, greater reductions in NOy and SOx will be required to achieve the target total deposition. Again, it would be helpful to include specific examples from the case studies to illustrate the calculations.

EPA does not currently regulate atmospheric reduced N, and we urge EPA to pursue developing regulations for atmospheric reduced N. Not only is reduced N a significant contributor to total deposition, but reduced N deposition is increasing in many areas of the country. We also encourage broader monitoring of reduced N to document contributions of reduced N to total N deposition.

We recognize that in implementing the standards, monitoring of NOy and SOx will be important to demonstrate attainment. In planning for implementation, we encourage EPA to consider in the AAPI a simpler definition of NOy that would focus on those components that are most important to monitor to represent total oxidized nitrogen. We agree that where there is currently limited available monitoring data, the Community Multiscale Air Quality (CMAQ) model is a reasonable method to estimate concentrations and deposition velocities for SOx, NOy and reduced N species. We would like to participate with EPA in implementation planning to address monitoring and other technical issues.

In summary, we believe EPA's approach to developing secondary standards for NOx and SOx is scientifically sound and that available information on ecosystems, atmospheric processes, and deposition are sufficient to apply this approach nationally to protect acid-sensitive aquatic ecosystems. We urge EPA to apply this approach to develop standards to protect acid-sensitive terrestrial ecosystems and pursue research to determine the ratio of base cations to aluminum that would be most protective of various terrestrial ecosystems. We also urge EPA to consider setting standards as soon as possible to protect certain western aquatic and terrestrial ecosystems that are currently harmed by excess N deposition and are not expected to be protected by acidification-based standards. Standards also need to be developed for coastal and other areas sensitive to nitrogen deposition. We appreciate this opportunity to comment and would like to continue to work with EPA to develop and implement ecologically relevant and protective secondary standards for NOx and SOx.

If you have questions, please contact Ellen Porter (303-969-2617) or Pat Brewer (303-969-2153) of my staff.

Sincerely,

Christine L. Shaver
Chief, Air Resources Division