

Comments from individual members of the Clean Air Scientific Advisory Committee (CASAC) Secondary NAAQS Review Panel for Oxides of Nitrogen and Sulfur to assist meeting deliberations. These comments do not represent consensus CASAC advice or EPA policy. DO NOT CITE OR QUOTE

**Comments from Dr. Charles Driscoll on the Draft (8-4-17) Report of the CASAC
Secondary NAAQS Review Panel for Oxides of Nitrogen and Sulfur**

8-29-17

General Comment

The only general comment is the tone to the letter to the Administrator. I thought that the letter might go further to indicate that the committee generally thought that the overall report and many of the chapters were remarkably comprehensive and well done particularly given the scope and the complexity of the problem.

Response to Charge Question 2

p. 4 line 44 - Revise the sentence as follows: In large part, the EPA has succeeded in accurately and clearly presenting a comprehensive ~~picture~~ **description** of the fundamentals of emissions, atmospheric chemistry, transport, and deposition of the major N and S species; the CASAC recognizes that developing this chapter was a monumental.”

p. 5 line 6 - Revise the sentence as follows: This **approach** will convey to the reader the major points discussed, provide structure and context, and set the stage for the expanded discussions on each topic that follows.

p. 6. Line 9 - The draft report states “Transference ratio is a new concept that was not discussed in the previous review of the NAAQS.” As I recall the concept of transference ratios was introduced in the last NO_x –Sox secondary standard review. This may not have been in the ISA, but maybe the REA or PA.

p. 6 line 42 - Revise the sentence as follows: More information on background concentrations and deposition should be included in Chapter 2; for example, see Galloway (1982) **or maybe considering data from remote sites from NADP such as AK.**

Response to Charge Question 3

p. 7 lines 11-13 - Revise the sentence as follows: NH₃ emissions in many regions of the U.S. are increasing (Li et al. 2016). Ecological impacts **of reduced N** on vegetation and ecosystems **are a central part of the N story critical to an overall understanding of effects of atmospheric N deposition** since N is delivered to ecosystems in both NO_x and NH_x forms.

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Response to Charge Question 4

p. 8 line 27 - Revise the sentence as follows: For example, some very acid sensitive ecosystems might have preindustrial ANC values of less than 50 $\mu\text{eq/L}$, so using this value as an endpoint for this naturally sensitive ecosystem might be **challenging or** inappropriate.

p. 8 line 30 - Revise the sentence as follows: The ~~downside~~ **limitation** to this approach is that there is uncertainty associated with hindcast projections of preindustrial indicators that should be recognized in the analysis.

P 8 line 36 - Revise the sentence as follows: Given the emphasis in the Draft ISA on critical loads as an approach to managing the effects of atmospheric deposition on ecosystems, it would be useful to include a brief discussion of the strengths and limitations of the three approaches to developing critical loads (i.e., empirical, steady-state, ~~and~~ dynamic modeling).

Response to Charge Question 5

p. 9 line 44 - Revise the sentence as follows: However, it is often difficult to determine where ~~acidity~~ **acidification effects** begin and end and ~~fertilizer-effect~~ **fertilization effects** begin and end. Chapter 5, ostensibly paired with Chapter 6 (which deals with effects of excess N), handles this challenge quite competently.

p. 10 line 28 – Revise the sentence as follows: Section 5.2 of the ISA presents a strong case that negative effects of acidification from elevated N and S occur because of ~~reduced~~ **decreases in available** Ca and base saturation in soil.

p. 10 line 38 - insert comma after “i.e.”

p. 10 line 44 - insert space after “Bc”

p. 11 line 14 - insert “However” and link the bullet to the previous bullet.

p. 11 line 30 - The difficulty in expressing values in mass units is that it is difficult to compare the acidification effects of S vs NO_3 vs NH_4 . I would rather see units expressed as eq/ha-yr or both mass based and equivalence based units.

Response to Charge Question 7

p. 16 line 21 - Revise the sentence as follows: The CASAC finds that Chapter 7 of the Draft ISA effectively synthesizes a large body of literature and provides a good summary of ~~the~~ **this** information.

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Response to Charge Question 8

p. 18 line 45 - The report states that “It would be more appropriate to place the paragraph on pages 8-67 and 8-68 (about TOC concentrations) in Chapter 7.” Should this be TOC or DOC?

Response to Charge Question 10

p. 22 line 1 - Replace “and” after “mid-Atlantic” with a comma

p. 22 line 18 - Revise the sentence as follows: The CASAC notes that the Draft ISA includes the important linkage of N to eutrophication and acidification in estuaries; which as brackish and relatively poorly buffered systems (compared to coastal waters) are particularly susceptible to **variations in pH swings**.

p. 22 line 42 - Revise the sentence as follows: This **input** would represent an important additional source of organic matter available for respiration and decomposition and indeed would lead to acidification.

p. 25 line 5 - Revise the sentence as follows: ~~Some newer~~ **More recent** studies support these observations of NO_3^- and NH_4^+ and diatom species distribution (Heil et al., 2007).

p. 25 line 30 - Revise the sentence as follows: This is because phytoplankton are flushed out of the systems ~~faster~~ **more rapidly** than they can accumulate as they grow.

p. 25 line 33 - “in situ” should be in italics

p. 25 line 34 - Revise the sentence as follows: In the highly eutrophic seagrass system on Cape Cod, Massachusetts DIN ~~levels~~ **concentrations** are always very low (< 1 μM) despite the very high N load.

p. 25 line 36 - Revise the sentence as follows: Similarly, in eutrophic estuaries (e.g., Neuse River and Pamlico River estuaries, North Carolina) the DIN is simply taken up so rapidly by the primary producers it seldom ~~accumulates~~ **is found in the water column** in significant amounts.

Response to Charge Question 12

p. 27 line 15 - Revise the sentence as follows: The interactions among S, SO_4 reducers, and Hg methylation rates are ~~complicated~~ **complex** and involve both bacteria and archaea.

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Response to Charge Question 14

p. 29 line 32 – Revise the sentence as follows: Further, some people think ecosystem services must involve ~~putting~~ **providing** dollar values on natural outcomes.

p. 30 line 24 – Revise the sentence as follows: The CASAC recommends adding more ~~plain spoken~~ **clearly articulated** stories/narratives to the Draft ISA to help the public understand the aspects of human welfare that are affected by NO_x, SO_x, or PM emissions and related deposition.

p. 30 line 26 - Revise the sentence as follows: Chapter 14 of the document would be a ~~great place~~ **an appropriate place** to articulate this alternative approach to conveying the human welfare impacts at stake in determining the secondary NAAQS.

p. 30 line 38 - Suggest replacing “recreator” with “a person who participates in recreational activities”

p. 31 line 14 - suggest replacing “water cycling” with “water resources”

Response to Charge Question 15

p. 36, line 20 should be “Smoky”

p. 37 line 21 “Sea” should not be in bold font