

Update on the NO_x/SO_x Secondary NAAQS Policy Assessment

Presentation to CASAC

July 22, 2009

Office of Air Quality Planning and Standards

Office of Air Programs

Purpose

- Overview of Policy Assessment Document
- Consideration of the Adequacy of the Current Standard
 - Adequacy of protection
 - Appropriateness of structure
- Introduction of Alternative Structure for Ecologically Relevant Standard(s)
 - Goals
 - Key Issues

Outline of Policy Assessment Document – Chapters 1-3

- Similar organization as previous staff papers
- Chapter 1 introduces the issues and gives brief history
- Chapter 2 is a policy relevant assessment of evidence related to effects on ecosystem functions and services drawn from the ISA
- Chapter 3 is a policy relevant assessment of key findings from the risk and exposure assessment including ecosystem services analyses

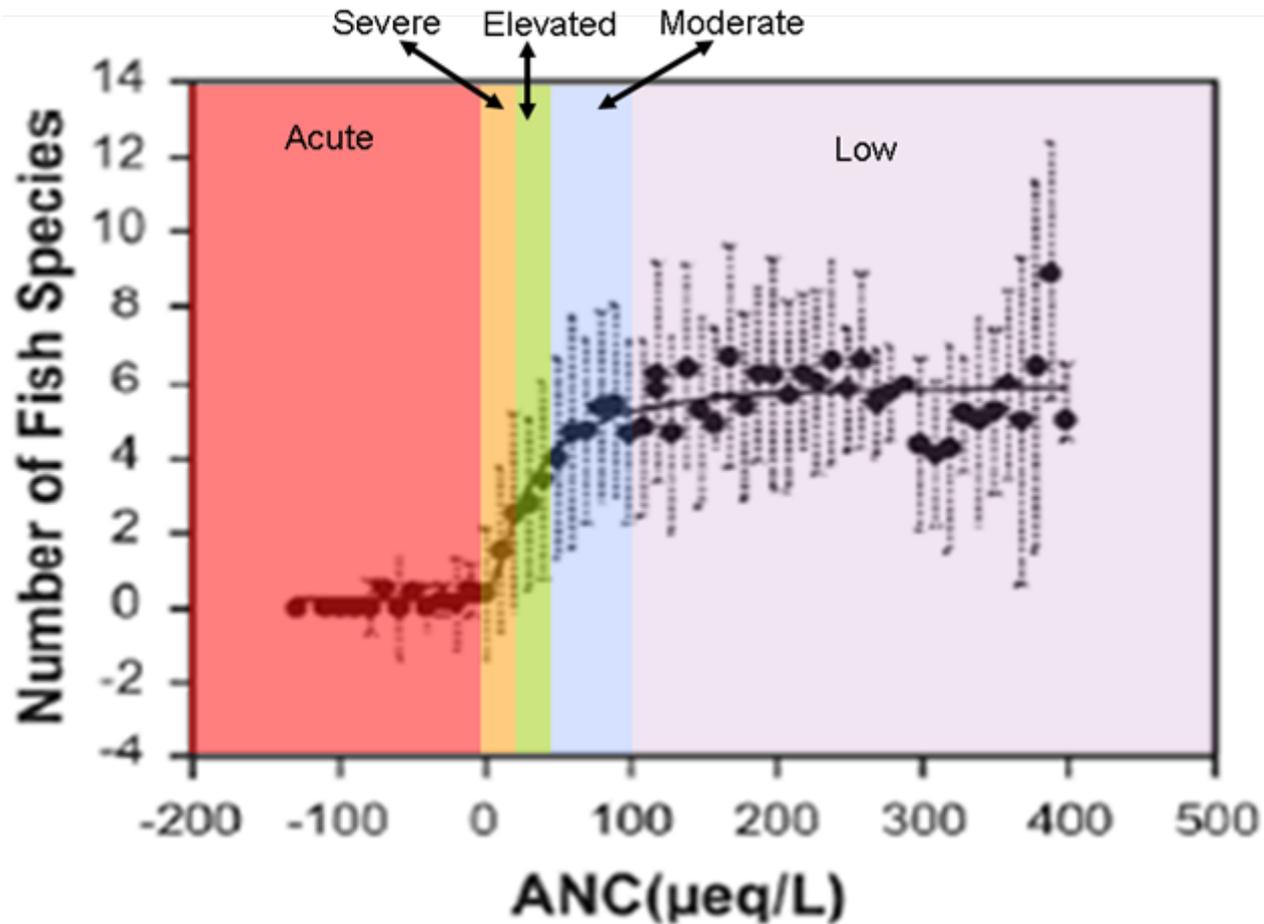
Outline of Policy Assessment Document – Chapters 4-5

- Chapter 4 outlines the general approach, policy relevant questions, and considerations of adversity to public welfare
- Chapter 5 discusses adequacy of protection under the current standards and appropriateness of the structure of the current standards
 - Outlines major components of an ecologically relevant standard(s)
 - Discusses variables that are important to the development of each of the components of an ecologically relevant standard

Outline of Policy Assessment Document – Chapter 6

- Identifies factors involved in relating deposition to atmospheric concentrations
- Initially focuses on aquatic acidification endpoint
 - Identifies ANC as ecological indicator
 - Identifies variables involved in relating level of ecological indicator to depositional load
 - Discusses potential structure of a secondary NAAQS for aquatic acidification
- Other Issues
 - Potential protection for terrestrial acidification effects as well as terrestrial and aquatic nutrient enrichment effects
 - Role of reduced nitrogen in aquatic acidification and other effects

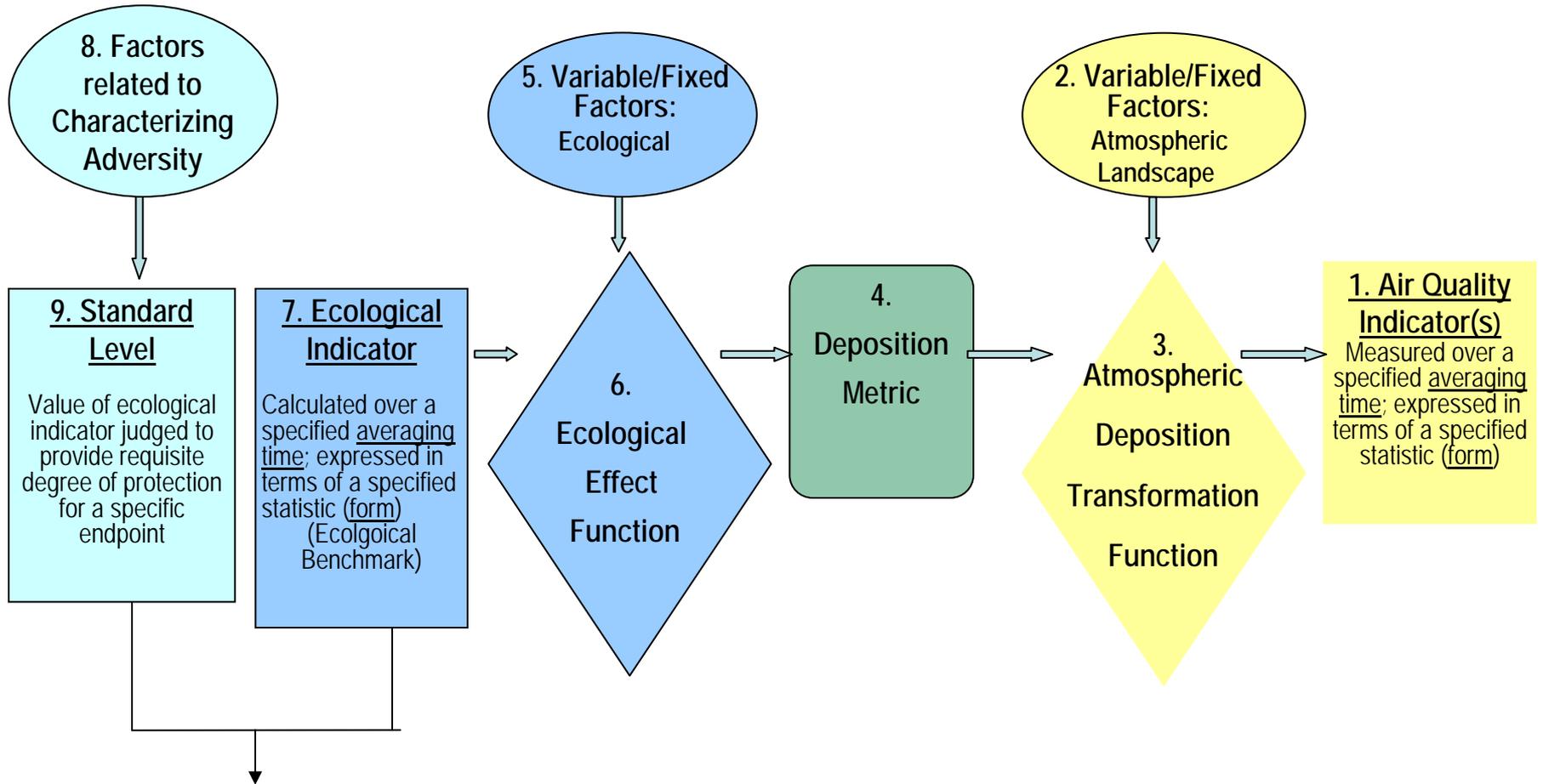
Adequacy of Protection



Appropriateness of Current Standards

- Current indicators do not take into account all contributions to N and S deposition, nor do they account for the common contribution of N and S to acidification
- Short averaging time of current SO₂ secondary standard is not ecologically relevant for cumulative deposition-related effects
- Structure of current standards is not designed to protect against deposition impacts to ecological systems
 - Limited monitoring in ecologically sensitive areas suggests that these effects are occurring in areas that would meet the current standards
- Current standards do not take into account spatial variability in impacts due to spatial and temporal variability in the geophysical and ecological factors

Policy Implications



10. To determine whether standard is met:

Compare measured concentrations of the air quality indicator(s) in ambient air to the calculated combinations of air quality indicators such that the ecological indicator value is greater than or equal to the ecological benchmark

Policy Overview and Goals

- Adverse effects to elements of specific ecosystems are occurring under current conditions for several endpoints
 - Varying confidence about ability to link air concentrations and effects
 - Multimedia confounding for aquatic nutrient enrichment
- An ecologically-relevant standard should relate deposition effects to an ambient indicator, which could be either directly observed ambient concentrations or a transformation of ambient concentrations
- As NO_x and SO_x both contribute to acidifying deposition, a meaningful standard would logically take into account interactions between them
- Important to consider the impact of reduced N in an ecologically relevant standard for aquatic acidification

Key Policy Issues: Aquatic Acidification Based Standard

- Determining appropriate degree of protection to protect public welfare related to aquatic acidification
- Best ways to use ecosystem services information and risk results to inform appropriate indicators, averaging times, levels and forms to develop standard(s)
- Identifying appropriate levels of ecological indicators for consideration in setting a standard

Key Scientific/Technical Issues: Aquatic Acidification Based Standard

- Determining method to calculate variables needed to develop maximum depositional loads
 - Weathering rate is most important variable in calculating depositional loadings
 - Many areas do not have data; TMDL programs are a potential source
- Characterizing ecologically relevant background acidification for specific areas
 - Identifying background acidification levels for lakes and streams in sensitive areas
 - Identifying those lakes or streams which have been so degraded that recovery is unlikely under any atmospheric condition
- Aggregation Issues: What spatial and temporal scales are appropriate from both a scientific and policy perspective for multiple aspects of the standard?

Key Scientific/Technical Issues: Aquatic Acidification Based Standard

- Develop sensitivity mapping that could be used to target areas of effect
 - Determine appropriate data sources
 - Develop process for screening
- Determining appropriate method for calculating deposition velocities to use in linking deposition and atmospheric concentration
 - Applicable on nationwide scale
 - Consideration of simplified methods that do not require speciation of NO_x everywhere
- Considerations of alternative indicators:
 - Currently considering SO_x to be SO₂(g) + SO₄(p)
 - Currently considering NO_x to be total NO_y(g) + NO₃(p)
 - No federal reference method currently for NO_y although it is being measured
 - Issue regarding combining particulate SO₄ with gaseous SO₂ to produce one value for SO_x
 - Investigating additional alternative indicators