Overview of the Scope and Methods Plan Supporting the Review of the Secondary NO_2/SO_2 NAAQS



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Presentation to CASAC

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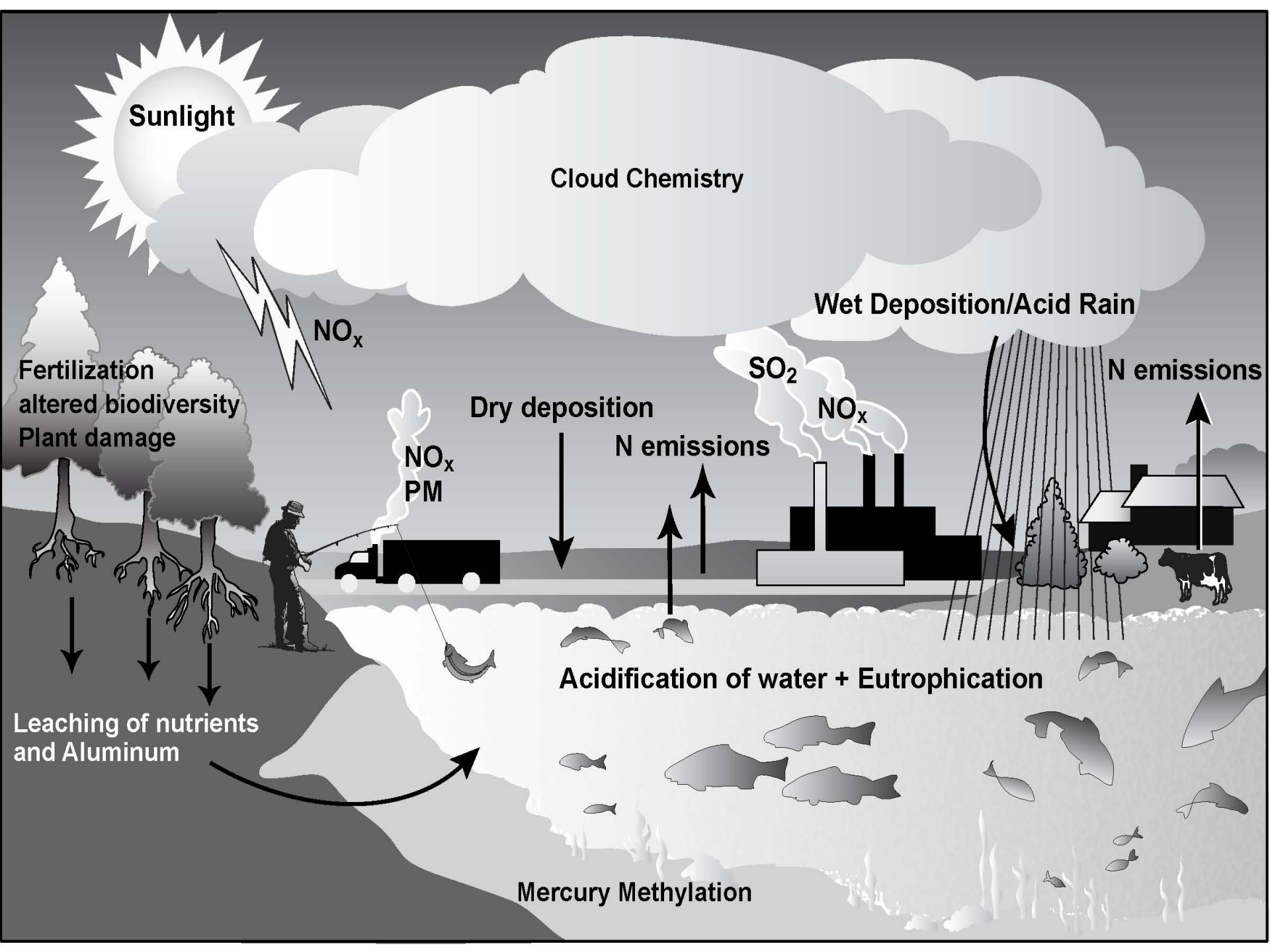
Office of Air Quality Planning and Standards

Purpose

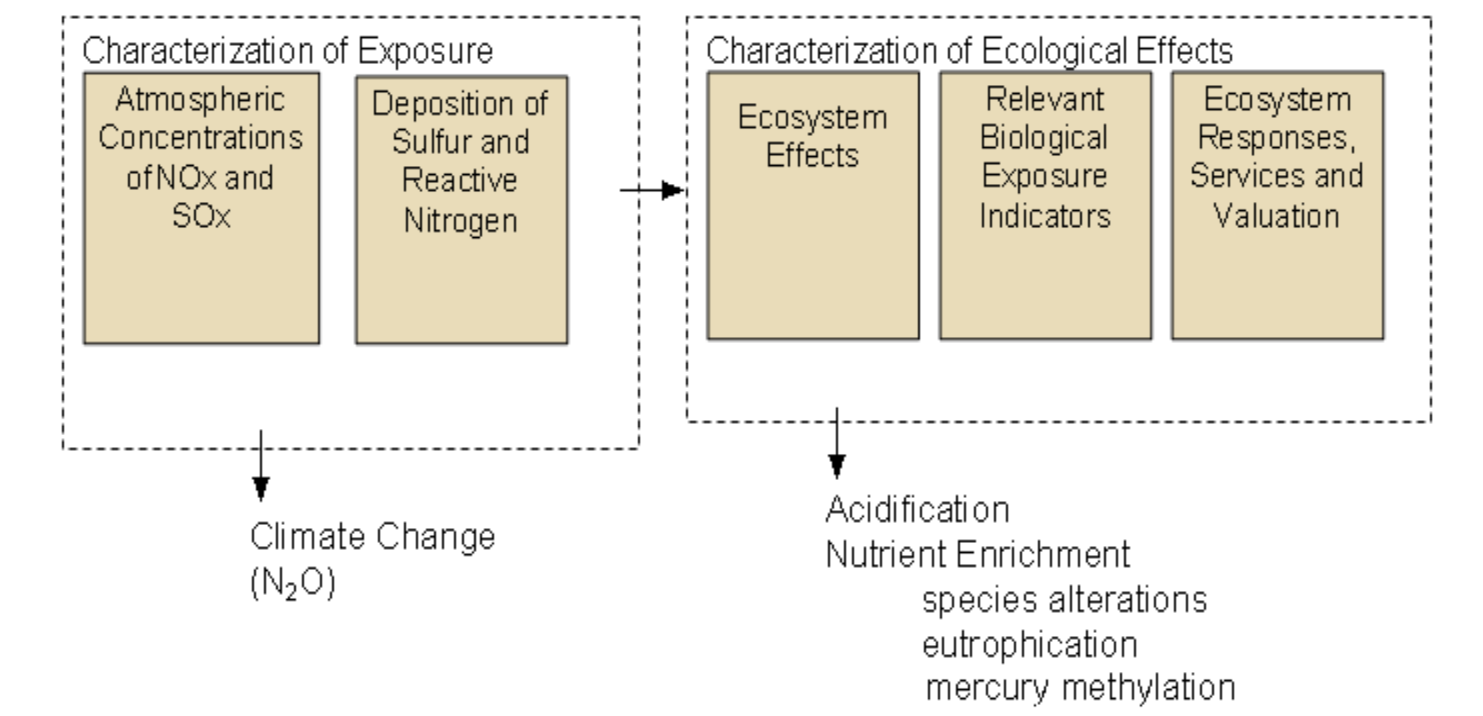
- Solicit feedback on EPA's planned approach to the NOx/SOx Secondary NAAQS Risk Assessment
  - Obtain guidance on breadth of the proposed risk assessment, which effects and case study areas should be targeted for this review

Overview

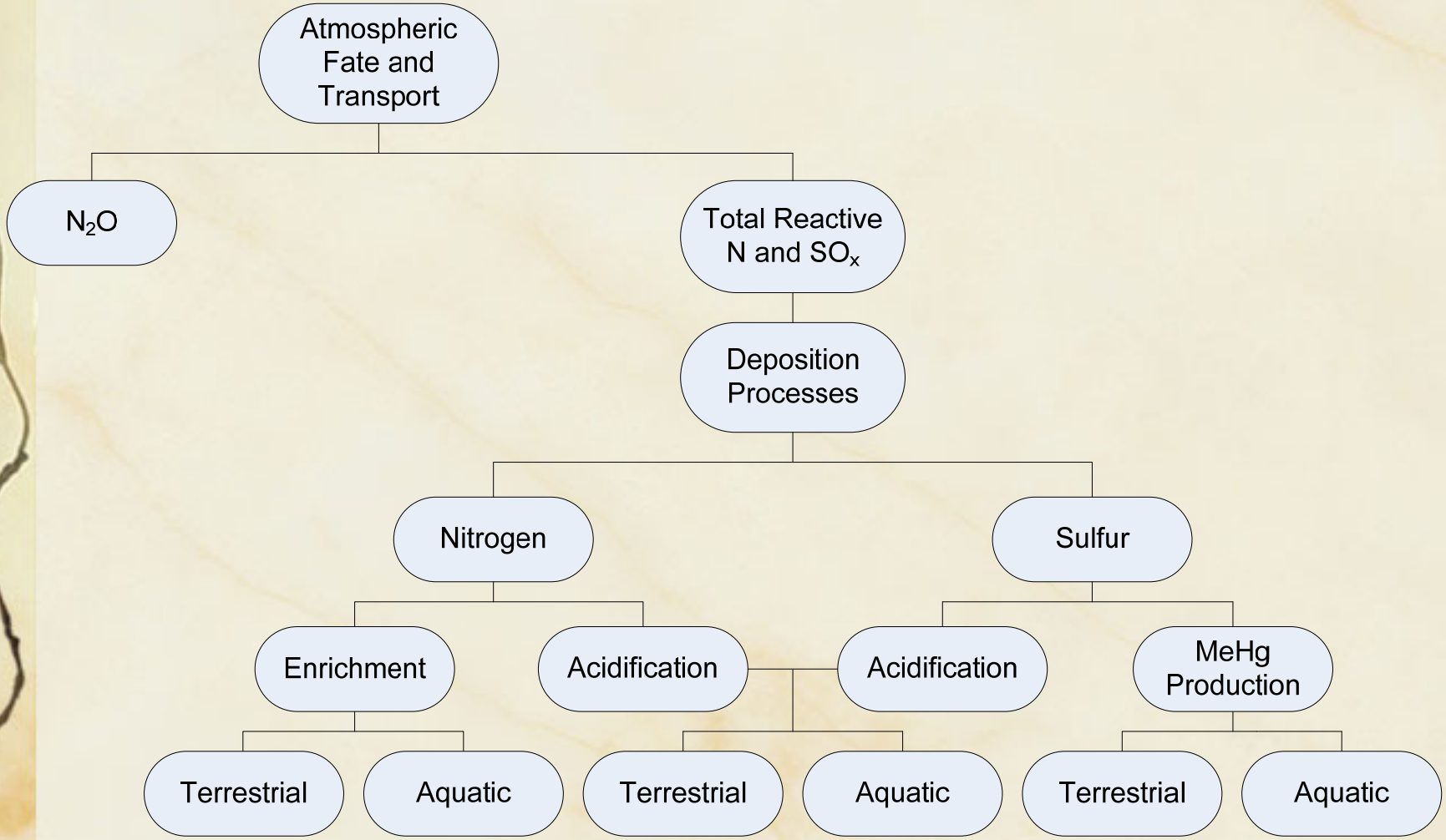
- Risk/Exposure Assessment
  - Overview of Risk Assessment Framework
  - Targeted Effects
    - Acidification
    - Nutrient Enrichment

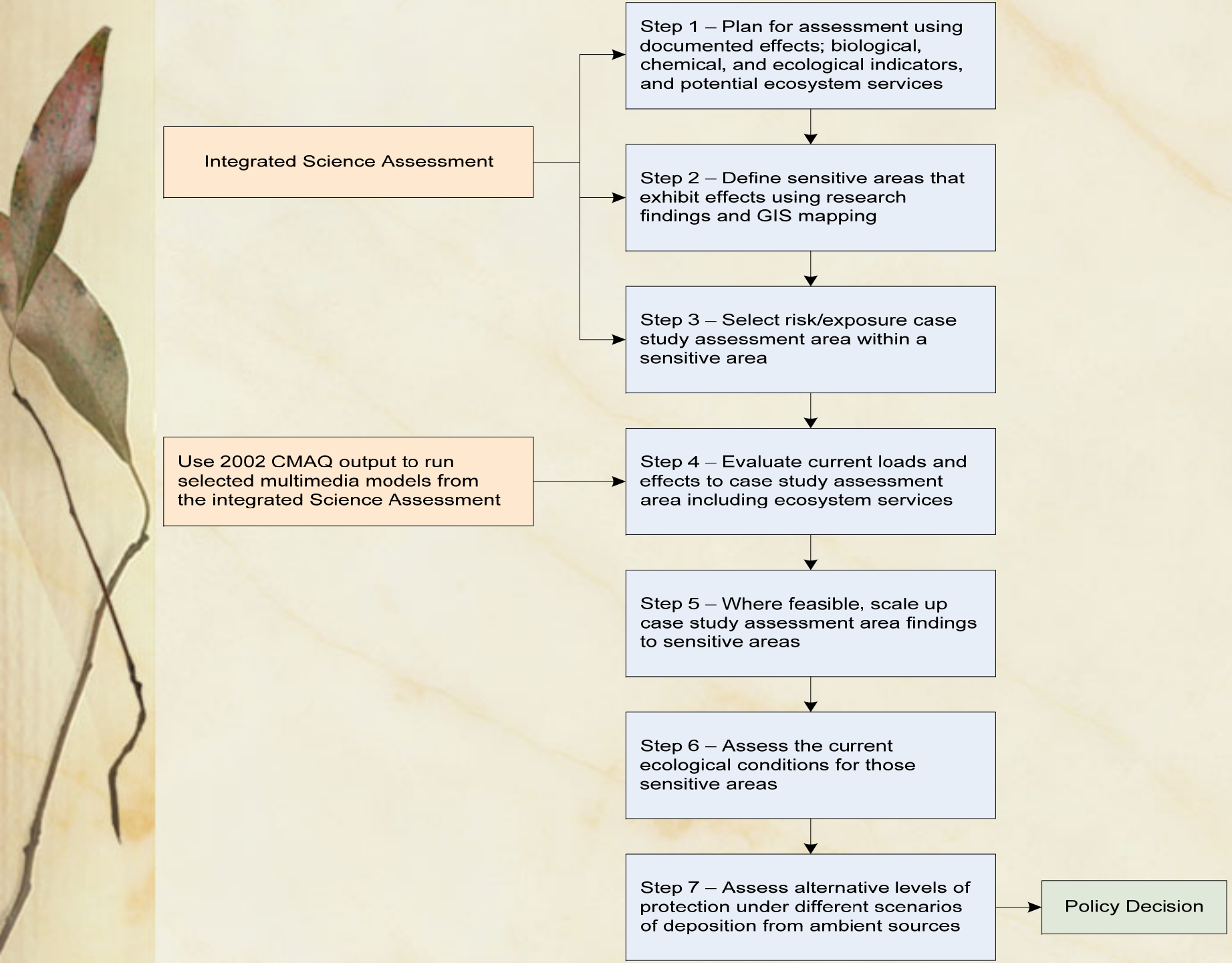

Sunlight
Cloud Chemistry
NO_x
Wet Deposition/Acid Rain
Fertilization
altered biodiversity
Plant damage
SO_2
NO_x
N emissions
Dry deposition
NO_x
PM
N emissions
Acidification of water + Eutrophication
Leaching of nutrients
and Aluminum
Mercury Methylation

Risk Assessment Framework



Targeted Effects




Integrated Science Assessment
Step 1 – Plan for assessment using documented effects; biological, chemical, and ecological indicators, and potential ecosystem services
Step 2 – Define sensitive areas that exhibit effects using research findings and GIS mapping
Step 3 – Select risk/exposure case study assessment area within a sensitive area
Use 2002 CMAQ output to run selected multimedia models from the integrated Science Assessment
Step 4 – Evaluate current loads and effects to case study assessment area including ecosystem services
Step 5 – Where feasible, scale up case study assessment area findings to sensitive areas
Step 6 – Assess the current ecological conditions for those sensitive areas
Step 7 – Assess alternative levels of protection under different scenarios of deposition from ambient sources
Policy Decision

Where are we now?

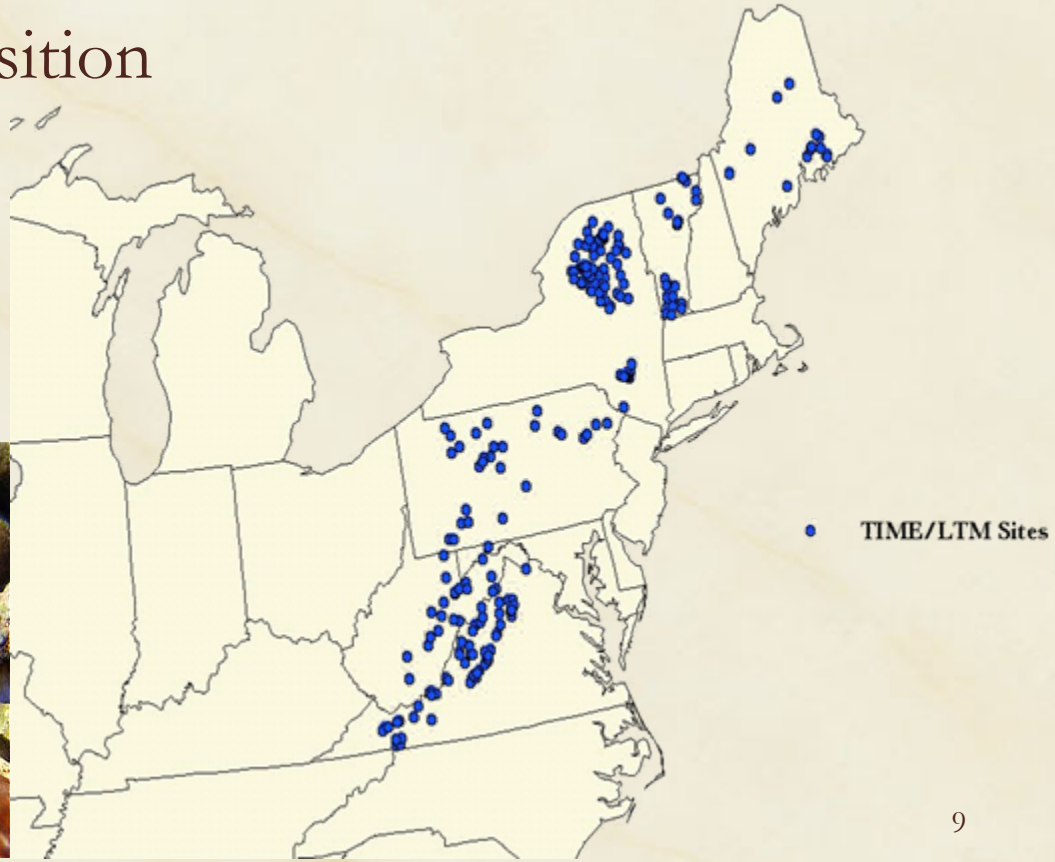
- Four main effect areas:
  - Aquatic acidification
  - Terrestrial acidification
  - Aquatic nutrient enrichment
  - Terrestrial nutrient enrichment
- Timeline
  - First draft RA to CASAC August, 2008
  - Second draft RA to CASAC March, 2009
  - Final RA July, 2009

Aquatic Acidification

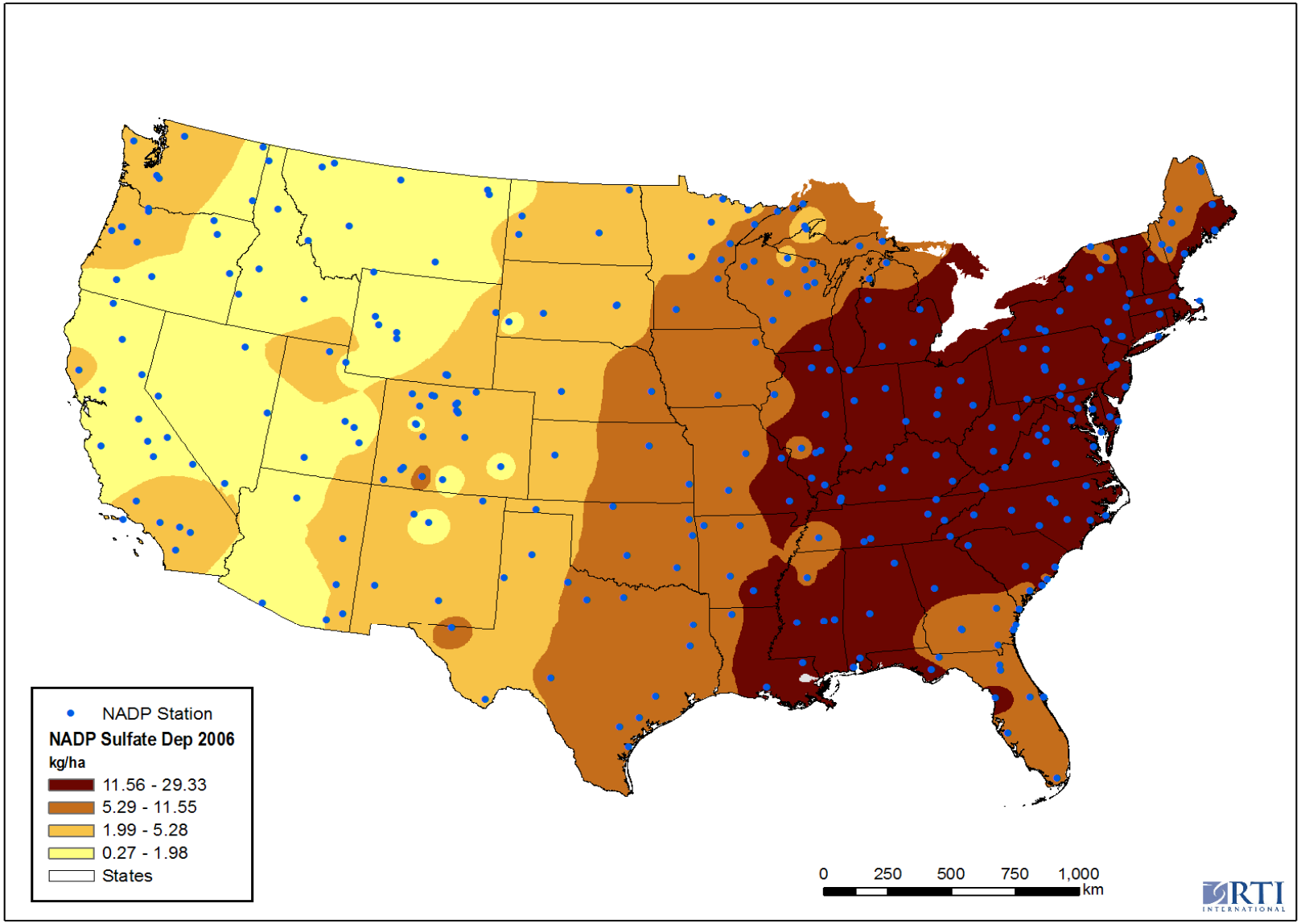
Examine ANC results and relationship to fish health

2002 CMAQ deposition

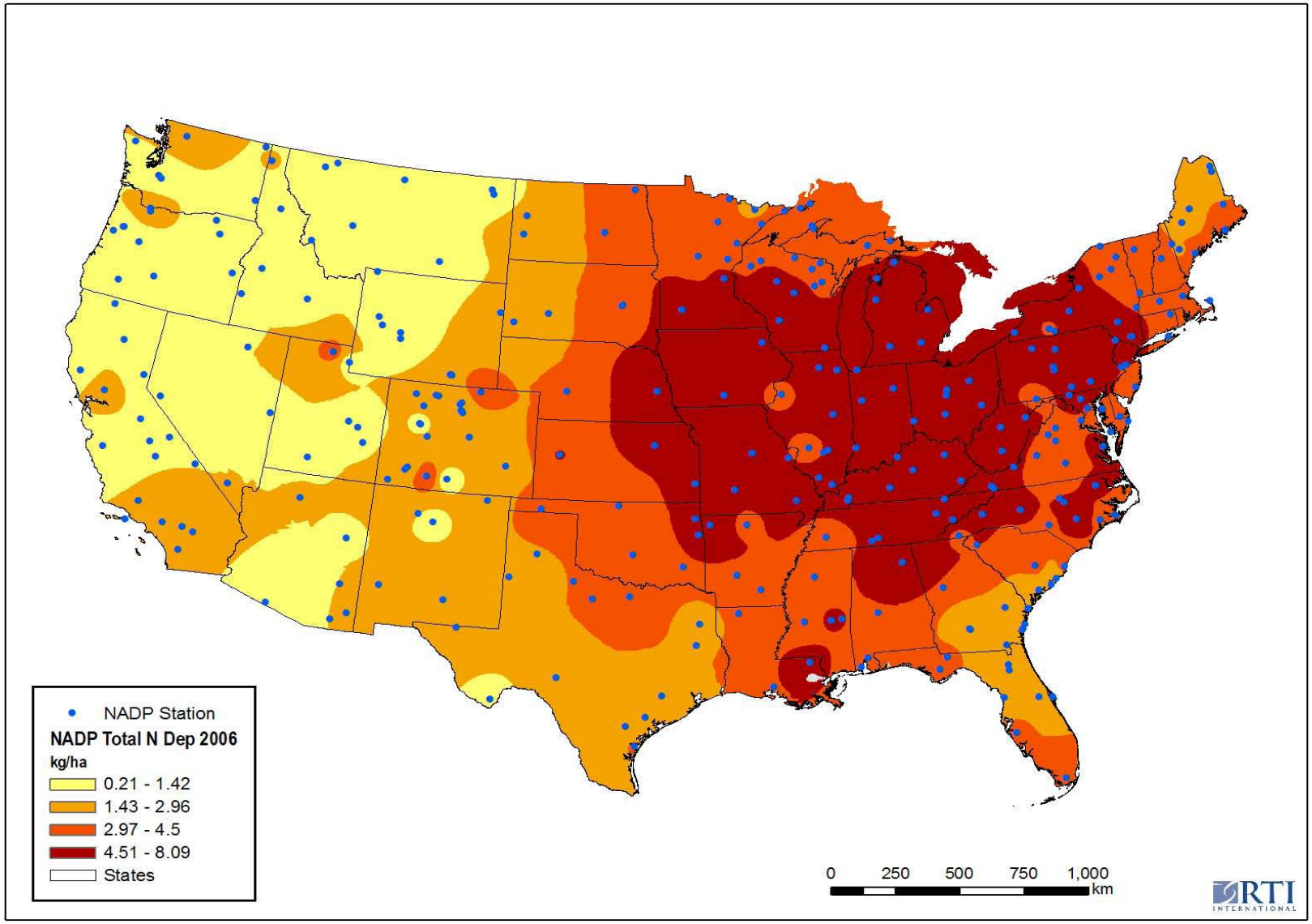
MAGIC model



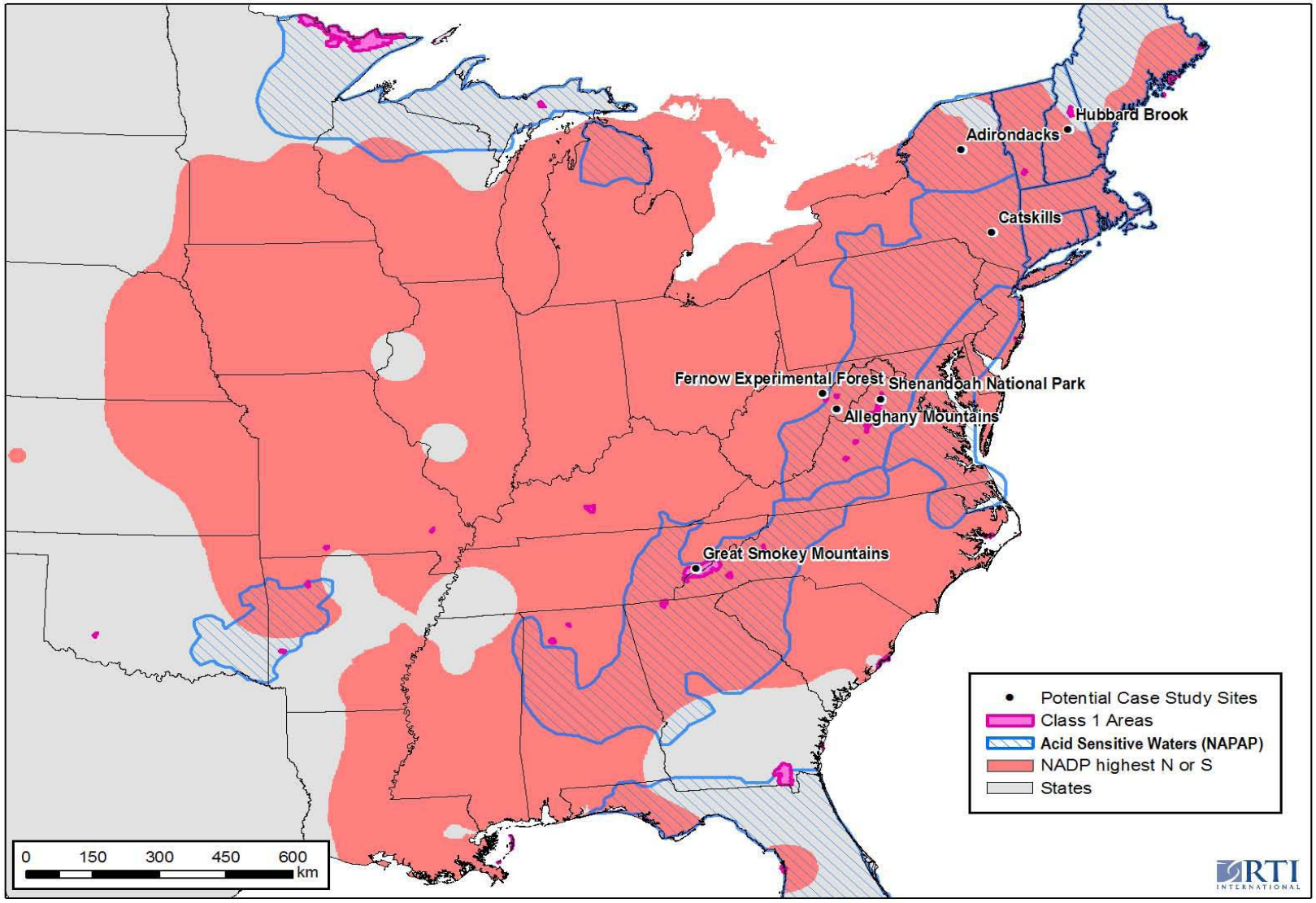
Sulfur Deposition (NADP)



Nitrogen Deposition (NADP)



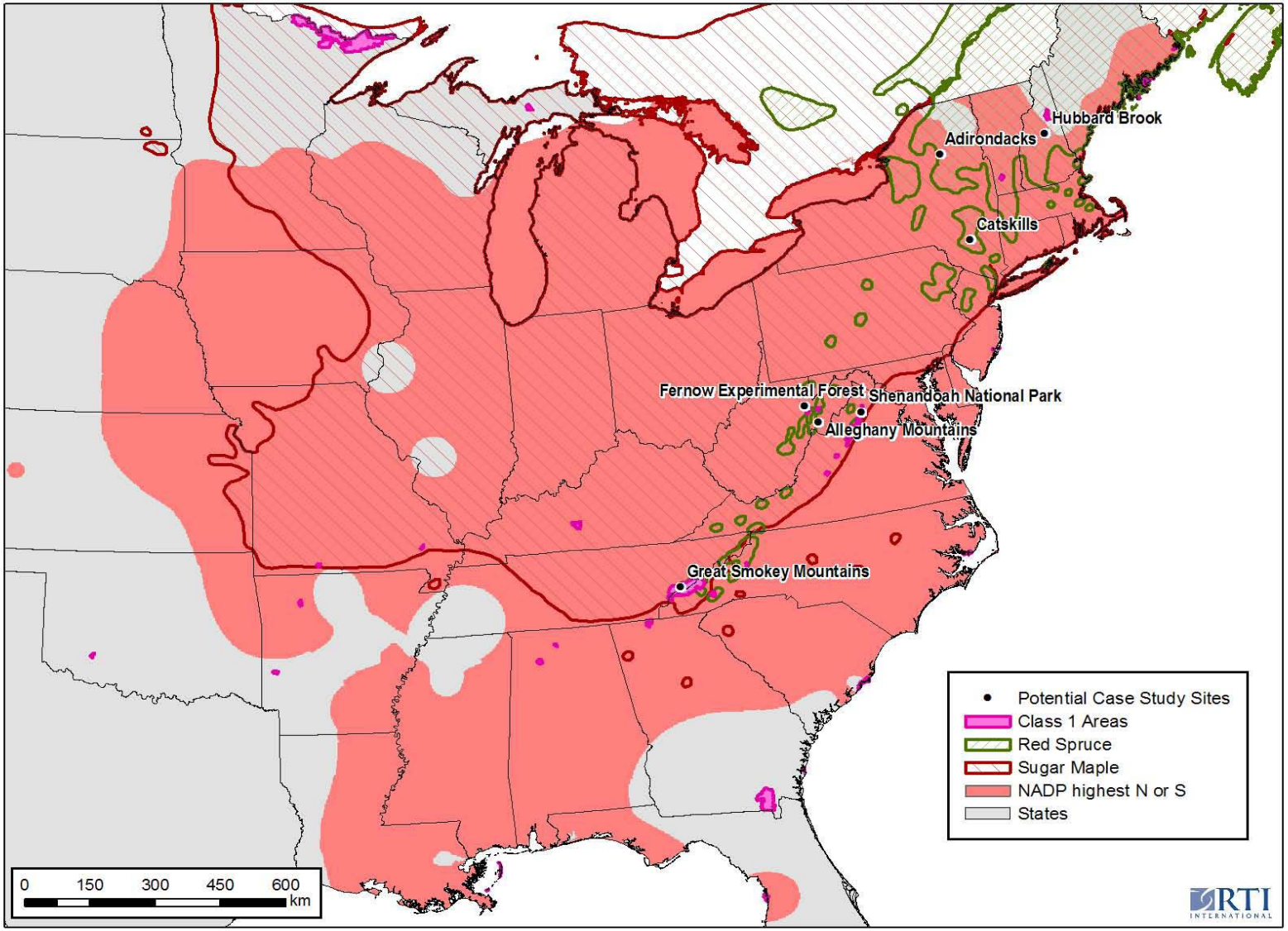
Aquatic Acid Sensitivity



Terrestrial Acidification

- Documented effects of acidification on red spruce and sugar maple
- Use the Simple Mass Balance model to examine changes in soil base chemistry
  - If possible, correlate to tree health

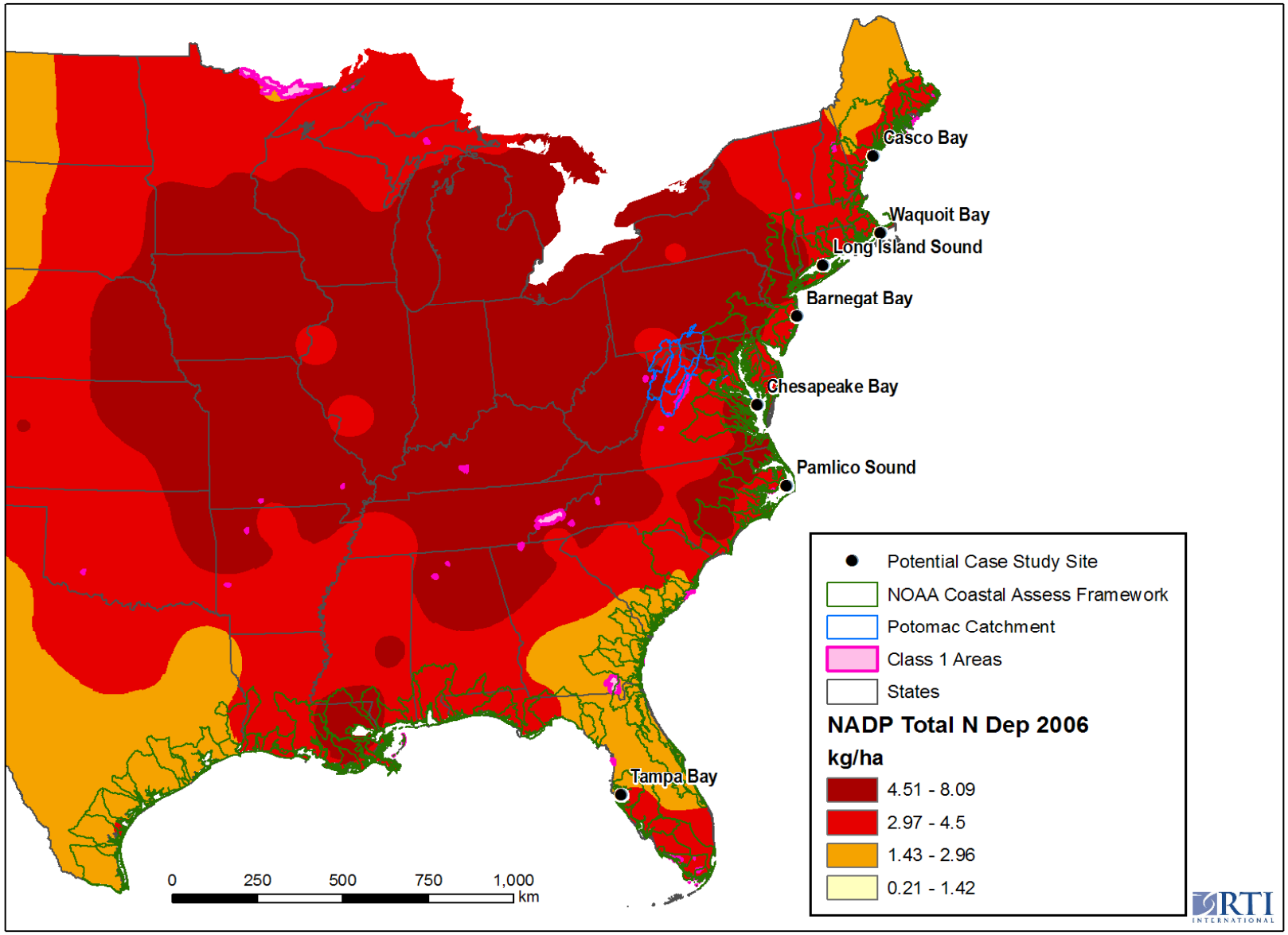
Terrestrial Acid Sensitivity



Aquatic Nitrogen Enrichment

- East and Gulf Coast estuaries show significant effects, however are difficult to model
- NOAA eutrophication indices
- Model main stem river of one or more estuaries
- Also considering using DayCent-Chem model on some alpine lakes in the West

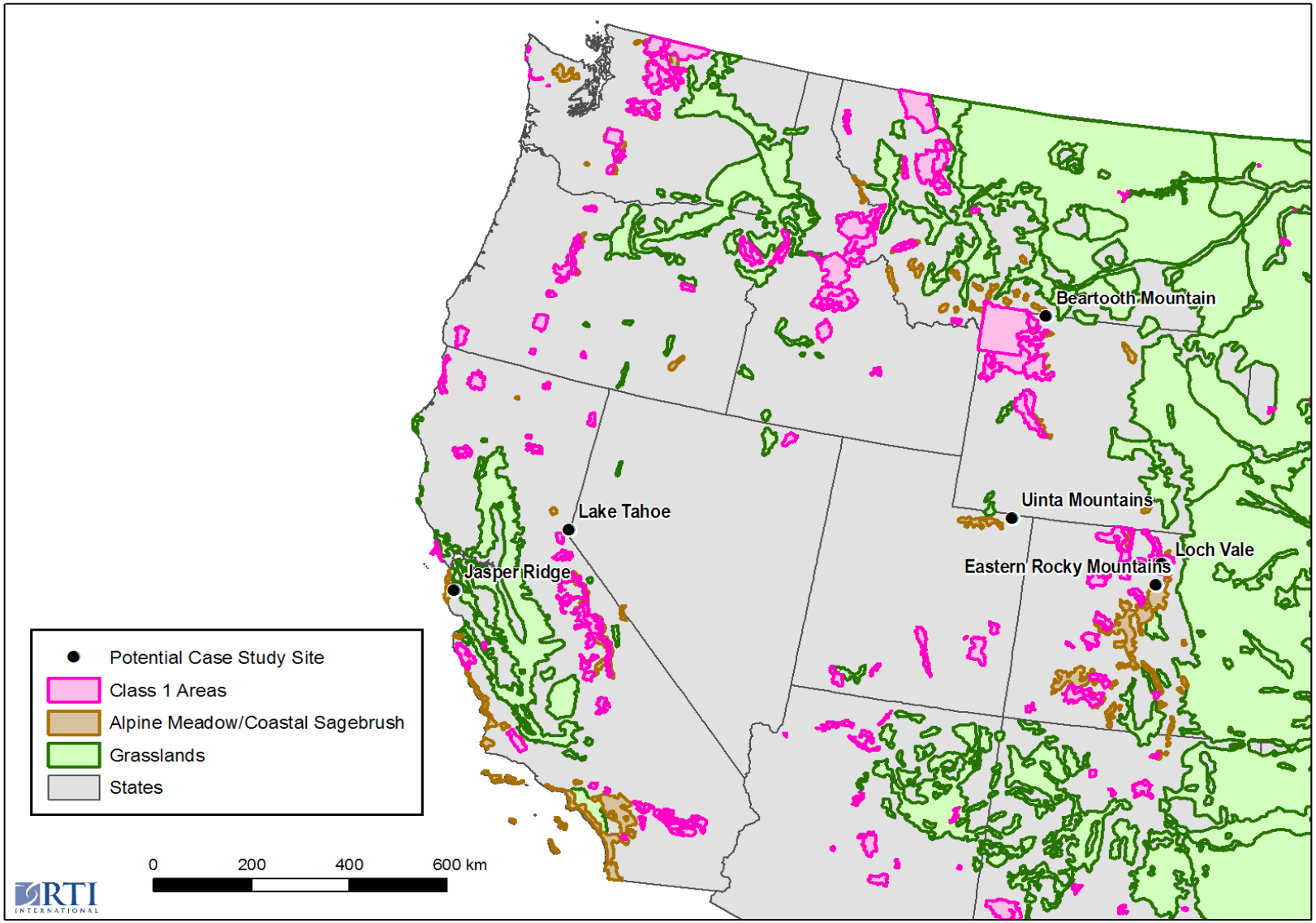
Aquatic Nitrogen Enrichment



Terrestrial Nitrogen Enrichment

- Several studies document changes due to enhanced Nitrogen deposition
- Effects are varied; empirical data
  - Array results using GIS to examine commonalities

Western Nitrogen Enrichment



Additional Effects

- We are evaluating how best to characterize additional effects. Qualitatively address:
  - Sulfur and Hg methylation
  - N_2O on climate