

SAB INTEGRATED NITROGEN PROCEDURAL PROPOSAL

1. Use the “Nitrogen Cascade” model as a conceptual framework.

There is not a more suitable model at this time to incorporate the air, land and water aspects of integrated nitrogen research and management.

2. Compartmentalize the nitrogen cascade.

An integrated approach is best constructed from its components that reflect both areas of expertise and more proximate relationships, e.g., air, land, water.

3. Identify stressors and receptors within each compartment.

This might start out as source to state relationships within the compartment. An example would be NO_x emissions to ozone (the stressor) and effects on humans (the receptor).

4. Apply risk analysis principles.

Identify levels of nitrogen that present a risk to humans, forests, fish, etc. within the compartment. Identify and quantify the primary sources of the stressor. Estimate the decreases in source loads necessary to protect the receptor from harm. Incorporate time/scale considerations.

5. Identify points of intervention and actions to reduce risk.

This may require tracking the stressor back through other compartments, e.g., managing river loads to an estuary that are derived from atmospheric deposition. Identify where the most effective and beneficial management can be applied.

6. Assess feasibility of attaining the target.

What are the management practices that are suitable to address the stressor? Identify alternatives that may be more productive than back-end controls, such as pollution prevention. Consider less immediate actions that are coupled with the effect, such as energy conservation. Also consider economic and societal needs and mores.

7. Develop a priority research agenda.

There will be areas where understanding is incomplete and will require research and assessment before this procedure could be fully implemented. There are likely to be compromises in whether existing science is good, or simply “good enough” that may require best professional judgment on how to proceed.

8. Integrate the findings.

This is where a matrix approach may be helpful to link the somewhat disparate cause and effect relationships within each compartment to create an integrated approach. Attention to common sources that have multiple effects is essential to ensure the most conservative actions are assigned an appropriate priority.

9. Assess the integrated approach with respect to EPA management structure.

It is likely that stressors will be fed by a mix of source types and will be of varied origin in time and space. Do existing management programs and protocols incorporate the flexibility to accommodate multimedia sources and crosscut management approaches? Where do the inconsistencies, and disconnects lie?