

**U.S. Environmental Protection Agency**  
**Science Advisory Board**  
Integrated Nitrogen Committee  
Public Teleconference Meeting  
September 14, 2007  
Final Minutes

**Committee:** Integrated Nitrogen Committee

**Date and Time:** September 14 from 2-4 Eastern Time as announced in the Federal Register on August 14, 2007, Volume 72, Number 156, Pages 45425-45426

**Location:** By Telephone Only

**Purpose:** On this conference call, Committee members summarized the progress they made on their assignments, identified what else was needed to complete the work, and engaged in other Committee business as needed

**Materials Available:** Materials made available for the INC's January 30-31 meeting, April 19 and June 8 teleconferences, and June 20-22 meeting are identified in those minutes. The additional materials made available for this call are listed on Attachment 1

**Attendees:** At the start of the meeting Aneja, Boyer, Cassman, Cowling, Dickerson, Doering, Galloway, Herz, Hey, Kohn, Lighty, Moomaw, Mosier, Paerl, Theis and Stacey were present. Drs. Mitsch and Shaw were unable to be on this call. No one from EPA or the public identified themselves as being on the call, although members of the public had indicated they wished to listen in and had been provided with the conference call number and code

**Summary:** In terms of content, the meeting went according to the agenda, but there was some re-ordering of agenda items and the call as a whole finished slightly earlier than expected.

The following actions and decisions resulted from the meeting:

1. Dr. Boyer will do data analysis. Everyone else will write.
2. The Working Group Leads will consult with their groups to determine when they can have their first draft – or in the case of the Environmental Systems Working Group, a revised draft. The Leads will report this information to the chair and DFO by Tuesday September 18.
3. The chair and DFO will use this information to propose times for subsequent conference call meetings of the INC.

4. INC members will send their comments on the potential consensus points drafted by Dr. Theis to him and he will revise the consensus points.
5. INC members may also wish to propose additional potential consensus points.
6. INC members will provide the DFO with names of potential speakers to address nitrogen trading in water for the October meeting.
7. The DFO will seek a presentation on nitrogen trading in air from Rich Haeuber or his delegate and seek his advice on the water trading names provided by INC members.
8. Dr. Lighty will work with Dr. Boyer to make sure Dr. Boyer can access the data at ACCESS.
9. The section on Biophysical Controls will be reorganized into terrestrial systems, aquatic systems, and industrial systems. Dr. Lighty will work with Dr. Moomaw to draft the section of the text relating to Industrial Systems.
10. Drs. Paerl and Mosier will work together to condense and place the text Paerl prepared on impacts of Nr in aquatic systems.
11. DFO should confirm INC members have the SAB Hypoxia Advisory Panel draft report URL.
12. INC may use the NO<sub>x</sub> and Ozone NAAQS as a case study in a “box” in its report because of their inter-relationship. Moomway invited written comments on this topic from INC members.
13. Drs. Mosier and Boyer agreed they would not be able to estimate turnover rates.
14. Before the October 15 call, INC members will read and provide general and specific comments on any chapters that have been distributed

#### **Further Information on Matters Discussed:**

After the DFO opened the meeting, the chair welcomed the members and asked if there were any additions to the agenda. There were no additions and the chair opened the Discussion of Writing Assignments.

#### **Producers Working Group**

The Producers Working Group, which is using use a modeling framework to look at the inflow and outflow of nitrogen over five watersheds, has made progress since the June 20-22, 2007 meeting of the INC, but has not yet drafted materials. Dr. Boyer is

doing the modeling and various INC members and Agency researchers are providing her with information.

There was a discussion on available fertilizer data and other inputs to the budget. For the budget she is developing for the October 29-31 INC meeting, Dr. Boyer will use county level fertilizer data from USGS NAWQA program and NADP emissions data. Mr. Herz will talk to Stan Daberkow at the Economic Research Service at USDA before providing Dr. Boyer with information from USDA/NAS on application rates and emissions factors. Dr. Boyer is proceeding with the analysis with currently available data and will accept criticism, use other data later, run a comparison, and perhaps run a sensitivity analysis later. Cassman agreed Boyer should go forward with what she has now for October and fine-tune it later.

Members viewed her budget as an input budget, rather than an input-output budget. While having inputs is critical to INC's mission, and outputs are related to inputs, INC must also attempt to quantify the losses of chemically reactive nitrogen, identify the major sources and processes responsible for these losses so that we can suggest those that can most easily and cost effectively be reduced. If INC is not doing the best job possible on quantitative outputs of nitrogen from these systems, then that is a deficit in their report. Some may view the monitoring data as sufficient, but others disagree because the monitoring data is aggregated and doesn't tell you the source of the nitrogen. Dr. Boyer agrees that the model won't provide the outputs, but believes INC can still discuss the source control issues using the literature, including the chemical form of the source, and opportunities for mitigation. Dr. Galloway observed they can't do better than the data allows. Dr. Cassman said to make improvements you can either reduce emissions to systems or reduce outputs. Dr. Boyer is doing a great job on inputs. INC also needs to do a good job with the outputs using available data so they can identify research needs.

### Risk Reduction Working Group

Group 4, established at the June 20-22 INC Meeting, is now known as the Risk Reduction Working Group (RRWG). The RRWG has expanded on the outline drafted at the June meeting and Dr. Theis has developed a set of potential consensus points to be used in further revisions of the outline.

Drs. Galloway and Theis believe beginning with the consensus points makes the writing the report much more efficient. Dr. Galloway hoped the discussion would identify whether there was consensus or not. He asked that each objector send an email to Theis with their objections. The points appear in bold below as drafted. The discussion of each follows immediately.

#### **Current policies and practices for nitrogen are not sustainable.**

This may not apply to each and every use of nitrogen.

If INC agreed current levels and expected trajectories of nitrogen export and impacts on environmental services are not sustainable, it could conclude more effective

policies and mechanisms for reducing the impact of nitrogen on the environment are needed.

**There are critical research needs with respect to reactive nitrogen that should be addressed (more effective application of nitrogen fertilizers, control of runoff and leachate, ammonia deposition rates, application of multimedia nitrogen models to sensitive regions).**

No objections were raised.

**Air and water quality regulations for nitrogen should be better integrated—national policy but emphasizing local impacts (e.g. NH<sub>3</sub>)**

No objections were raised and supportive statements were made.

**There is a need to routinely measure and report a new metric for nitrogen—Total Reactive Nitrogen (TRN).**

Dickerson suggested “chemically reactive nitrogen” to exclude N<sub>2</sub>O and made some related editorial comments.

**Better monitoring for ammonia in air is needed. Ammonia as criteria pollutant?**

Ammonia plus Ammonium could be monitored as an indicator.

The combination could be considered a new criteria pollutant or indicator.

**Although the global budget for N<sub>2</sub>O is fairly well known, there is a need to better quantify specific sources and natural variability (e.g. agricultural and wetland systems).**

This could be improved by explaining why this need exists.

**Many of the costs of our current nitrogen policies are external to the systems that generate reactive nitrogen (e.g. the environmental costs and impacts of artificial fertilizer)**

This is true for all fertilizers, not just artificial ones.

**Management of reactive nitrogen involves the recognition of trade-offs (e.g. dietary needs vs. the degradation of ecosystem services; generation of N<sub>2</sub>O from denitrification vs. emission of nitrate).**

The ecosystem services matrix from June 20-22, 2007 meeting shows trade-offs. Provisioning should be optimized with a minimal of coastal impacts.

**Policies for the management of nitrogen should focus on ways to identify benefits and costs, and to levelize costs. Reexamination of the role of agricultural subsidies, the imposition of “reactive nitrogen taxes”, and the development of market mechanisms (e.g. cap-and-trade) are all possible options.**

No oral comments, but written ones will be sent.

**The role of education requires greater definition (e.g. BMPs for intensive agriculture, feedlots; raising the level of awareness of the population on nitrogen impacts and dynamics).**

Education has tipped the scale on greenhouse gases so that is almost universally recognized that something must be done. This has not yet happened for nitrogen. A nitrogen analogy to Al Gore's movie, *An Inconvenient Truth*, and lectures on global climate change could be made.

There is education to recognize the problem and education on how to reduce it. Both aspects should be included.

There appears to be agreement that it should be done and no consensus yet on how.

After the discussion the chair encouraged the INC to send their thoughts to Dr. Theis who invited additional points as well.

The RRWG might have a partial first before the October face-to-face meeting.

Impacts & Metrics Working Group

Dr. Moomaw will pull together the consensus points for the Impacts & Metrics Working Group. Because he had been unable to attend the INC June 20-22 meeting, Dr. Moomaw sought clarification on some points relating to the ecosystems services matrix developed by the INC at the meeting.

Dr. Moomaw observed that the air quality aspects are significant and severe. Most of the sources come from energy, not agriculture. These need to be addressed more carefully. INC might review how EPA manages nitrogen now, chemical by chemical, media by media, which reflects the enabling legislation. INC will point out where it works well, like ammonia water quality standards. INC can also point out where it breaks down because EPA ignores the nitrogen cascade. It breaks down where reactive nitrogen moves from media to media. This would be a natural way to lead into the ecosystem services discussion. Ecosystems are inherently multi-media.

The emerging NO<sub>x</sub> and Ozone NAAQS might make an interesting case study, perhaps as a box in the text. Because NO<sub>x</sub> is an important pre-cursor to ozone perhaps the two regulations should be addressed in tandem. The NAAQS for NO<sub>2</sub> is way higher than is suitable for the ozone standard. Most cities are in compliance with the NO<sub>2</sub> standard but often not ozone. The same would be true for CO and VOCs which EPA continues to regulate because of their impact on ozone. Dr. Theis observed that the NAAQS are largely health based and the MEA is based on ecosystem services. Dr. Moomaw invited written comments.

## Environmental System Working Group

Dr. Mosier said the overall idea is to put numbers on the nitrogen cascade. Outline Section 3.3.1 is the budget Dr. Boyer is working on. Section 3.3.2 has been partially addressed and Dr. Dickerson will provide text for the atmospheric section using annual averages. Dr. Boyer's analysis will provide information for the terrestrial part and on flows between systems.

In terms of reconciling emissions and depositions, Dr. Dickerson thinks they can quantify the relationship between emissions and deposition for large distances and time scales. INC can that the non-linearities will make an annual average misleading in some cases and explain why.

The ESWG drafted a section on aquatic controls. The chair would like to see more on physical and chemical controls from Drs. Boyer and Dickerson. Dr. Dickerson said it is easy to address for power plants and cars and ammonia emissions from fossil fuels are minor. INC should say something like it's minor, we don't know, or research is needed. A well-received suggestion was made to organize this section by: (1) terrestrial systems, (2) aquatic systems, and (3) industrial systems. Drs. Lighty and Moomaw will add some things on the third area.

Section 3.3.4 will be fleshed out more after other sections have been drafted and Dr. Boyer's results are available.

Because the INC is behind schedule, the chair proposed that the October 15 public teleconference include a quick update on progress. Before that call, INC members will read and provide general and specific comments on any chapters that have been distributed and Working Group 4 will revise its consensus points.

Although the chair suggested that the other working groups draft their consensus points because this will contribute to the report writing, some members were concerned that the INC was moving too quickly to consensus points before dealing the substance. At this point it would be appropriate to consider those for the RRWG and any other large scale points, leaving the rest to later.

The discussion of speakers for the October 29-31 INC meeting, yielded the following recommendations:

Nitrogen Trading should include presentations on both air and water.

– Rick Haeuber or designee would be suitable for air.

– Members will send their suggestions for water to the DFO

Internationally – Gil Castellanos

4<sup>th</sup> Int'l Nitrogen Committee – INC members

Europe – Erisman

Developing a schedule for the drafts and reviews depends, in part, when the working groups will have their drafts ready. He would like INC to have a draft that they would not be embarrassed to share with people by next February. Vanessa Vu has proposed a workshop emphasizing getting more input on the practical aspects of risk management controls and options. This might take place on the dates now set aside for the April meeting. Dr. Moomaw thinks such a workshop would be interesting. It will be necessary to get the right people. Mr. Herz agrees as did Dr. Cowling. No one disagreed.

The chair asked if there was anyone on the phone from the public and no one identified themselves. There were no public comments, written or oral.

When the chair asked the INC to identify any additional agenda items for the October 15 teleconference of October 29-31 meetings, no one added anything. The October 15 Conference Call will address progress over the last month, general comments on any chapter drafts that have been distributed, and revisit the consensus points from RRWG and the new ones from other WGs.

The October 29-31 INC meeting will include discussion of consensus points from the RRWG and any other large scale points, discussion of problems with pulling together information, presentations on N trading, on European and other international nitrogen management methods.

The DFO adjourned the meeting at 3:45

Respectfully Submitted:

*/Signed/*

Ms. Kathleen E. White  
Designated Federal Official

Certified as True:

*/Signed/*

Dr. James N. Galloway, Chair  
SAB Integrated Nitrogen Committee

## Attachment 1

1. Final Agenda for the September 14 Public Teleconference
2. Potential Consensus Points drafted by Dr. T. Theis
3. Draft report outlines and schedules
4. Simplified color-coded report outline by relevant working group
5. Drafts of:
  - 3.3.2.2. Storage of Nr within Terrestrial Environmental Systems
  - 3.3.3. Biogenic controls on transfer and transformations of Nr in and between environmental systems.
  - 3.3.4. Critical numbers on budgets and flows that are either highly uncertain and/or are important for EP
6. Nitrogen Impacts on Aquatic Ecosystems by Hans W. Paerl
7. URL for draft SAB Hypoxia Advisory Panel draft report ([http://epa.gov/sab/pdf/8-30-07\\_hap\\_draft.pdf](http://epa.gov/sab/pdf/8-30-07_hap_draft.pdf))
8. Wetlands two-pager prepared by Mitsch
9. Federal Register notice for September 14, October 15, and October 29-31 public INC meetings.
10. URL for accessing NOAA's National Estuarine Eutrophication Asmtt. Update (<http://ian.umces.edu/nea> and <http://www.eutro.us>)
11. URL for Chesapeake Bay Report on Corn for Biofuels/Nitrogen Loading ([http://www.cbf.org/site/DocServer/biofuels\\_waterquality\\_report.pdf?docID=9343](http://www.cbf.org/site/DocServer/biofuels_waterquality_report.pdf?docID=9343))
12. Economic Implications of Public Policies to Change Agricultural Nitrogen Use and Management
13. URL for SAB's Committee on Valuing the Protection of Ecological Systems and Services (CVPESS) draft report ([http://epa.gov/sab/pdf/c-vpress\\_draft\\_report\\_6-05-07.pdf](http://epa.gov/sab/pdf/c-vpress_draft_report_6-05-07.pdf))
14. Email from USDA's Mark Wallbridge transmitting citations and two papers in press by Jorge Delgado
15. URL for EPA nutrient criteria guidance (<http://www.epa.gov/waterscience/criteria/nutrient/>)
16. Nutrient Policy Memo
17. URL for news story, *Rewarding fertilizer pollution with crop subsidies* ([http://pubs.acs.org/subscribe/journals/esthag-w/2007/june/science/kc\\_nitrate.html](http://pubs.acs.org/subscribe/journals/esthag-w/2007/june/science/kc_nitrate.html))
18. URL for publication on turf published by the Southern Ag Experiment Station Directors, and funded by the Forest Service, ANLA and PLANET. It covers all states. Sod sales and most lawn care (including DIY) is probably included, but the economic impact of golf, parks, sports turf management, and other forms of turf maintenance are not included in this economic survey. ([http://www.cals.ncsu.edu/saaesd/scsb/list/S-1021%20Bulletin%20\(3\).doc](http://www.cals.ncsu.edu/saaesd/scsb/list/S-1021%20Bulletin%20(3).doc))
19. Chair's approval of minutes, emailed October 5, 2007

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