

**US EPA Science Advisory Board Integrated Nitrogen Committee (INC) Public  
Teleconference July 8, 2009  
12:00 p.m. – 3:00 p.m. (Eastern Time)**

Committee: The SAB Integrated Nitrogen Committee (See Roster - Attachment A)

Date and Time: July 8, 2009, 12:00 p.m. – 3:00 p.m. (Eastern Time)

Location: Participation by Telephone Only

Purpose: The purpose of the teleconference is to discuss a draft report on an integrated strategy for managing reactive nitrogen.

Attendees: Members of the Integrated Nitrogen Committee (INC)

Dr. James N. Galloway (Chair)

Dr. Thomas L. Theis (Vice-Chair)

Dr. Viney Aneja

Dr. Kenneth Cassman

Dr. Ellis Cowling

Dr. Russell Dickerson

Dr. Otto C. Doering III

Dr. JoAnn S. Lighty

Dr. Arvin Mosier

Dr. Hans Paerl

EPA SAB Staff

Dr. Angela Nugent [Designated Federal Officer (DFO)]

Members of the Public (see Attachment D)

**Teleconference Summary:**

The teleconference generally followed the meeting agenda (see Meeting Agenda - Attachment C) to discuss the June 22, 2009 INC draft report. The DFO took roll for members of the committee and announced that one written public comment was received from Mr. William Hammerich on behalf of the Colorado Livestock Association and there were no formal requests for public oral comment.

The Chair, Dr. James N. Galloway, asked that the committee discuss the action items remaining from the May 2009 INC face-to-face meeting (Attachment E); the list of Additional Items for Committee Discussion identified by the DFO (Attachment F); public comments received from Mr. Hammerich; and comments provided by committee member Dr. Donald Hey.

The committee discussed items in Attachments E and F item by item and decided on action items captured in those matrices (Attachments E and F identify those Action

Items in capital letters). Dr. Galloway asked members to send text by July 27th to the DFO reflecting changed language for her to incorporate into the next draft of the report. The DFO asked members to contact her if they need an MS Word version of the June draft report to use as the basis for their revisions.

Members decided to reserve discussion on action items relating to Drs. Elizabeth Boyer and Paul Stacey until July 9th when those committee members would be available to participate in a public teleconference. The committee also noted that revisions previously developed for section 2.3.1.2 and revised text developed on target goals in section 3.4.2 had not been incorporated in the June draft. This language should be incorporated into the next draft.

After discussing the action items, the committee briefly discussed the comments received from the Colorado Livestock Association. Members noted that the association seemed to have misread the draft report; the INC draft report did not recommend that average protein content be decreased. It noted, instead, on page 137, line 27 that moderating the increase in high protein diets "by decreasing the average amount of total protein consumption is one mechanism of limiting part of the expected increased N requirement in food production." Committee members expressed the view that this statement was factually correct.

In regard to the Association's comment that the draft report did not provide adequate context for the recommendation to decrease livestock-derived ammonia emissions by 30 percent, the committee noted that it had identified action items to strengthen the rationale for this recommendation in section 3.4 and to include a brief summary statement supporting the recommendation to appear in the report's executive summary.

The chair then asked the committee to address several issues related to the report's draft Executive Summary. Dr. Galloway noted that the SAB Staff Director had committed to providing comments on the draft executive summary to help the document serve more effectively as a stand alone document that is easily understandable by lay persons. The DFO stated that she would be able to provide Dr. Vu's comments by July 13th; Drs. Galloway and Theis noted that Dr. Vu's comments would be distributed to the committee. Dr. Galloway then asked the committee to consider comments provided by Dr. Donald Hey, who suggested that the Executive Summary address diet issues. The committee expressed the view that the report did not address diet issues in any detail to "back up" the suggested language. Dr. Russ Dickerson noted that Dr. Hey suggested that the Executive Summary define "climate forcing" more clearly; he volunteered to provide additional language.

The chair asked the DFO to provide a draft agenda for the committee's July 9, 2009 teleconference call. The agenda should include a discussion of key points to discuss in the committee's letter to the Administrator transmitting the report.

Respectfully Submitted:

/Signed/

Angela Nugent  
Designated Federal Official

Certified as True:

/Signed/

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

List of Attachments

Attachment A: Roster of the SAB Integrated Nitrogen Committee

Attachment B: Federal Register Notice

Attachment C: Meeting Agenda

Attachment D: Attendees from the Public Who Requested or Were Provided Call-in Information

Attachment E: Draft List of Action Items from May 2009 INC Meeting not addressed by June INC Draft report

Attachment F: Additional Items for Committee Discussion identified by the DFO

**Attachment A:**

**U.S. Environmental Protection Agency  
Science Advisory Board  
Integrated Nitrogen Committee**

**CHAIR**

**Dr. James Galloway**, Sidman P. Poole Professor of Environmental Sciences  
Associate Dean for the Sciences, College and Graduate School of Arts and Sciences,  
University of Virginia, Charlottesville, VA

**VICE-CHAIR**

**Dr. Thomas L. Theis**, Director, Institute for Environmental Science and Policy,  
University of Illinois at Chicago, Chicago, IL

**MEMBERS**

**Dr. Viney Aneja**, Professor, Department of Marine, Earth, and Atmospheric Sciences,  
School of Physical and Mathematical Sciences, North Carolina State University, Raleigh,  
NC

**Dr. Elizabeth Boyer**, Associate Professor, School of Forest Resources and Assistant  
Director, Pennsylvania State Institutes of Energy & the Environment, and Director,  
Pennsylvania Water Resources Research Center, Pennsylvania State University,  
University Park , PA

**Dr. Kenneth G. Cassman**, Professor, Department of Agronomy and Horticulture,  
Institute of Agriculture and Natural Resources, University of Nebraska, Lincoln, NE

**Dr. Ellis B. Cowling**, University Distinguished Professor At-Large Emeritus, Colleges of  
Natural Resources and Agriculture and Life Sciences, North Carolina State University,  
Raleigh, NC

**Dr. Russell R. Dickerson**, Professor and Chair, Department of Meteorology, The  
University of Maryland, College Park, MD

**Dr. Otto C. Doering III**, Professor, Department of Agricultural Economics, Purdue  
University, W. Lafayette, IN

**Mr. William Herz**, Vice President for Scientific Programs, The Fertilizer Institute,  
Washington, DC

**Dr. Donald L. Hey**, President of The Wetlands Initiative and Director, Wetlands Research, Inc, Chicago, IL

**Dr. Richard Kohn**, Professor, Animal Sciences Department, University of Maryland, College Park, MD

**Dr. JoAnn S. Lighty**, Chair and Professor, Chemical Engineering, University of Utah, Salt Lake City, UT

**Dr. William Mitsch**, Professor, Olentangy River Wetland Research Park, The Ohio State University, Columbus, OH

**Dr. William Moomaw**, Professor of International Environmental Policy and Director of the Center for International Environment and Resource Policy, The Fletcher School of Law and Diplomacy, Tufts University, Medford, MA

**Dr. Arvin Mosier**, Visiting Professor, Agricultural and Biological Engineering Department, University of Florida, Mount Pleasant, SC

**Dr. Hans Paerl**, Professor of Marine and Environmental Sciences, Institute of Marine Sciences, University of North Carolina - Chapel Hill, Morehead City, NC

**Dr. Bryan Shaw**, Commissioner, Texas Commission on Environmental Quality, Austin, TX

**Mr. Paul Stacey**, Director, Bureau of Water Management and Land Reuse, Planning and Standards Division, Connecticut Department of Environmental Protection, Hartford, CT

**SCIENCE ADVISORY BOARD STAFF**

**Dr. Angela Nugent**, Designated Federal Officer, 1200 Pennsylvania Avenue, NW 1400F, Washington, DC, Phone: 202-343-9981, Fax: 202-233-0643, (nugent.angela@epa.gov)

## Attachment B: Federal Register Notice

### Science Advisory Board Staff Office; Notification of Two Public Teleconferences of the Science Advisory Board Integrated Nitrogen Committee

[Federal Register: June 24, 2009 (Volume 74, Number 120)]  
[Notices]  
[Page 30077]  
From the Federal Register Online via GPO Access [wais.access.gpo.gov]  
[DOCID:fr24jn09-79]

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ENVIRONMENTAL PROTECTION AGENCY  
[FRL-8922-4]

Science Advisory Board Staff Office; Notification of Two Public  
Teleconferences of the Science Advisory Board Integrated Nitrogen  
Committee

AGENCY: Environmental Protection Agency (EPA).  
ACTION: Notice.

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SUMMARY: The EPA Science Advisory Board (SAB) Staff Office announces  
two public teleconferences of the SAB Integrated Nitrogen Committee  
(INC) to discuss the committee's draft report.

DATES: The SAB INC will conduct two public teleconferences on July 8,  
2009 and July 9, 2009. Both teleconferences will begin at 12 p.m. and  
end at 3 p.m. (Eastern Time).

ADDRESSES: The teleconferences will be conducted by telephone only.

FOR FURTHER INFORMATION CONTACT: Any member of the public wishing to  
obtain general information concerning the two public teleconferences  
may contact Dr. Angela Nugent, Designated Federal Officer (DFO), via  
telephone at (202) 343-9981 or e-mail at [nugent.angela@epa.gov](mailto:nugent.angela@epa.gov). General  
information concerning the EPA Science Advisory Board can be found on  
the EPA Web site at <http://www.epa.gov/sab>.

SUPPLEMENTARY INFORMATION: Pursuant to the Federal Advisory Committee  
Act, Public Law 92-463 5 U.S.C., App. 2 (FACA), notice is hereby given  
that the SAB INC will hold two public teleconferences to discuss its  
draft report. The SAB was established pursuant to 42 U.S.C. 4365 to  
provide independent scientific and technical advice to the  
Administrator on the technical basis for Agency positions and  
regulations. The SAB is a Federal Advisory Committee chartered under  
the Federal Advisory Committee Act (FACA), as amended, 5 U.S.C., App.  
2. The SAB will comply with the provisions of FACA and all appropriate  
SAB Staff Office procedural policies.

Background: The SAB INC is studying the need for integrated  
research and management strategies to reduce reactive nitrogen in the  
environment. At the global scale, reactive nitrogen from human  
activities now exceeds that produced by natural terrestrial ecosystems.  
Reactive nitrogen both benefits and impacts the health and welfare of

people and ecosystems. Scientific information suggests that reactive nitrogen is accumulating in the environment and that nitrogen cycling through biogeochemical pathways has a variety of consequences. Information about the committee's previous meetings is available on the SAB Web site at [http://yosemite.epa.gov/sab/sabproduct.nsf/fedrgstr\\_activites/Nitrogen%20Project](http://yosemite.epa.gov/sab/sabproduct.nsf/fedrgstr_activites/Nitrogen%20Project).

The purpose of the teleconferences is for the SAB INC to discuss the committee's draft report addressing the environmental problems presented by reactive nitrogen and providing recommendations related to an integrated nitrogen management strategy.

Availability of Meeting Materials: Agendas and materials in support of the teleconferences will be placed on the SAB Web site at <http://www.epa.gov/sab> in advance of each teleconference.

Procedures for Providing Public Input: Interested members of the public may submit relevant written or oral information for the SAB INC to consider during the advisory process. Oral Statements: In general, individuals or groups requesting an oral presentation at a public teleconference will be limited to three minutes per speaker, with no more than a total of one hour for all speakers. Each person making an oral statement should consider providing written comments as well as their oral statement so that the points presented orally can be expanded upon in writing. Interested parties should contact the DFO, in writing (preferably via e-mail) at the contact information noted above, by July 6, 2009 to be placed on the list of public speakers for the meeting.

Written Statements: Written statements should be received in the SAB Staff Office by July 6, 2009 so that the information may be made available to the Committee members for their consideration. Written statements should be supplied to the DFO in the following formats: one hard copy with original signature, and one electronic copy via e-mail (acceptable file format: Adobe Acrobat PDF, MS Word, MS PowerPoint, or Rich Text files in IBM-PC/Windows 98/2000/XP format). Submitters are requested to provide versions of each document submitted with and without signatures, because the SAB Staff Office does not publish documents with signatures on its Web sites.

Accessibility: For information on access or services for individuals with disabilities, please contact Dr. Angela Nugent at (202) 343-9981 or [nugent.angela@epa.gov](mailto:nugent.angela@epa.gov). To request accommodation of a disability, please contact Dr. Nugent preferably at least ten days prior to the teleconferences to give EPA as much time as possible to process your request.

Dated: June 17, 2009.  
Anthony Maciorowski,  
Deputy Director, EPA Science Advisory Staff Office.  
[FR Doc. E9-14858 Filed 6-23-09; 8:45 am]  
BILLING CODE 6560-50-P

## Attachment C: Meeting Agenda

**EPA Science Advisory Board  
Integrated Nitrogen Committee  
Public Teleconference  
July 8, 2009, 12:00 p.m. - 3:00 p.m. (Eastern Time)**

### Agenda

**Purpose:** The purpose of the teleconferences is for the SAB INC to discuss a draft report addressing the environmental problems presented by reactive nitrogen and providing recommendations related to an integrated nitrogen management strategy.

12:00 – 12:05	Opening of Teleconference	Dr. Angela Nugent, Designated Federal Officer
12:05 – 12:10	Review of Agenda	Dr. James N. Galloway, Chair Dr. Thomas Theis, Vice-Chair
12:10 – 12:20	Public Comment	TBD
12:20 - 1:45	Discussion and Resolution of Committee-identified issues	Committee
2:45– 3:00	Summary and Next Steps	Dr. James N. Galloway
3:00	Adjourn	

**Attachment D: Attendees from the Public Who Requested Call-in Information**  
Public participants

Holly Campbell  
EPA ORD/NHERL

Duane Gangwish  
Nebraska Cattlemen - VP Environmental Affairs

John J. Jansen  
Principal Scientist  
Southern Company

Charles Kovach  
Senior Scientist  
Florida Department of Environmental Protection, SW District

Patrick McNamara  
Region 7 Science Program Aide  
Office of the Regional Administrator

Karla Perez  
Policy Navigation Group

Bruce D. Rodan  
US EPA/ORD/OSP

Clifford S. Snyder, PhD, CCA  
Nitrogen Program Director  
International Plant Nutrition Institute

Allan Stokes  
Director, Environmental Programs  
National Pork Board

Tamara McCann Thies  
Chief Environmental Counsel  
National Cattlemen's Beef Association

Rosaura Vega  
U.S. Environmental Protection Agency  
Office of Wetlands, Oceans, and Watersheds

**Attachment E: Draft list of Action Items from May 2009 INC Meeting not addressed by June INC Draft report**

	Who identified	Issue/Action item	
1)	Russ	<b>Beth was going to send Arvin and me some info on Published CMAQ runs -</b>	Russ -- will call Beth
2)	Tom	Axis on old figure 22 needs to be changed to Tg N (Bill Herz was to do)	Tom to follow up
3)	Jim	The figure axes and legends are garbled for Figure 26	Angela to follow up
4)	Jim	Change title for Table 6  Ken's suggested title: Livestock N excretion per kg production (g/kg) and per total US (Tg /yr)	Go with it
5)		Bill Moomaw will provide Table A entry on hypoxia in the Chesapeake	Jim will contact Bill
6)		<u>Replace term "losses" with "transfers"</u>  J	<u>_IM WILL FOLLOW UP AND CONSIDER KEN'S SUGGESTION THAT WITH AGRICULTURAL SYSTEMS, IT MAY BE MORE APPROPRIATE TO SAY "MOVEMENT OF REACTIVE NITROGEN TO OTHER SYSTEMS" OR MAKE A STATEMENT EARLY IN THE REPORT ABOUT HOW THE TERM "LOSSES" IS BEING USED.</u>
7)		Greg Isaac comment Page 25, Figure 3: All aquatic and terrestrial systems are identified as having some denitrification potential, except for oceans. But	Jim will send other copy of figure three for insertion

	Who identified	Issue/Action item	
		denitrification does occur in the oceans.	
8)		Melillo comment: P31, L32 – would it be possible to add a column to indicate primary sources of this information - <b>Beth will provide information</b>	
9)	Viney and Ken	Melillo comment, p. 51: P51 – biofuels discussion should note that if biofuels feedstocks are going to be grown on marginal lands, additional N inputs and irrigation may be needed. <i>Also Otto will draft text addressing additions to this point, updating literature references and provide to Viney and Ken</i> <i>Sent e-mail Otto June 5, 2009</i>	Otto provided text
10)		Melillo comment, p. 97 P97, table – a better table can be taken from the Millennium Assessment	Tom already addressed
11)	Viney and Ken	McIssaac comment, p. 39, line 15: it would be nice to have a citation to the recommendations referred to. <i>Bill Herz or Otto Doering wrote this; we must ask them for a citation. Sent an e-mail to Otto on June 4, 2009.</i>	Viney will get reference from Bill
12)		McIsaac cp.,emt Page 69, Figure 14: I think it is dangerous to presume a trend from two data points (the 1985 and 2005 maps). I have looked at the full series of maps available on the web, and I agree that there probably is a real trend, but I think it would be better to present and analyze the annual time series, as	

	Who identified	Issue/Action item	
		<p>was done for nitrate.</p> <p><b>Action item: Beth will Insert table showing time series and include contemporary figure showing spatial pattern, provide to Arvin and Russ</b></p>	
13)	Viney and Ken	<p>Schauer comment p. 58 Recommendation 5 is really not a feasible recommendation. It is not really possible to measure trends in fugitive or areas sources. Networks like NADP are used as an assessment tool to study trends in emissions. A better recommendation may to be expand the locations or measurements of the NADP and STN networks</p> <p>Action item: Insert mention of NEON in Finding 5. Note that EPA and NSF should work with USDA. Bill Moomaw to provide suggested language to Viney</p>	Angela will get reference from Bill

**Attachment F: Additional Items for Committee Discussion identified by the DFO  
(ACTION ITEMS IDENTIFIED IN "CAPS")**

	<b>Page</b>	<b>Issue</b>	<b>Suggested action item</b>
1)	p.8	Table A: - what should order of effects be? Alpha?	Jim: I have ordered them.
2)	p. 8 line3	Refers to health declines but morbidity not on table. Also for citation, Why not refer to EPA/OAQPS 2008 NOx Integrated Science assessment?	RUSS WILL PROVIDE INFO ON MORBIDITY
3)	p. 8	Report emphasizes importance of climate effects (see pg 16, line 11), but they are not discussed in the table	The table has examples; it is not meant to be complete.
4)	p. 10, line 12, 13, 16, 20	Replace NR "is lost to the environment" with ??? Passim -- text using nitrogen "loss" term shaded in yellow* in track change version of report. Peer reviewers had suggested using a different term because	Angela. For this instance only, replace "lost to the environment" with "transferred to the environment"
5)	p. 12	Figure 1 -- where does human and animal waste fit in? It is emphasized so much in the report but doesn't appear in this important figure.	Human and animal waste are not new sources of Nr. Jim will make text change to stress this.
6)	p.15	4th bullet -- how does figure 2 show that the sum of outputs is 14.7 Tg?. Hard to see where "outputs" should appear	Jim. Alter text to state what the outputs are.

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\*Angela created a track change version of the report that tracks with this list and shades "nitrogen loss" terms in yellow

	<b>Page</b>	<b>Issue</b>	<b>Suggested action item</b>
7)	p. 17	Report states: There is strong scientific evidence to show that Nr deposition rates of 10 – 20 kg N per hectare per year can cause negative impacts on a variety of ecosystems. Where is the evidence for this presented? citation	Jim. Add a citation
8)	p.21-22	What's the basis for the target recommendations? See comments below for section 3.4	<p>Discuss target recommendations in structured way:</p> <ul style="list-style-type: none"> <li>- identify target goal &amp; recommendation</li> <li>- describe basis for deriving target recommendation</li> <li>- explain why recommendation is important</li> </ul> <p>TOM -- REVISE TEXT, IF NECESSARY ON PAGE 147 AND EXTRACT FOR EXECUTIVE SUMMARY</p> <p>KEN -- IN EXECUTIVE SUMMARY : DEVELOP BRIEF TEXT ON PAGE...(something along these lines)AS A RESULT OF COMPREHENSIVE REVIEW OF NITROGEN CYCLING AND FACTORS AFFECTING IT, IT WAS POSSIBLE TO IDENTIFY CRITICAL POINTS WHERE INTERVENTIONS CAN BE MADE TO MAKE CRITICAL INTERVENTIONS TO REDUCE NITROGEN. SAY RATIONALE IS PROVIDED LATER IN THE REPORT</p> <p>RUSS, JOANN, KEN TO PROVIDE BRIEF</p>

	<b>Page</b>	<b>Issue</b>	<b>Suggested action item</b>
			SUMMARY SENTENCES TO EXPLAIN THE BASES FOR TARGET RECOMMENDATIONS
9)	p. 20, line 4	Refers to "critical load recommendations" but these are not defined.	Jim will revise ES
10)	p. 23	Title of section 1.1 -- Please consider renaming the section: This section doesn't seem to be about "Environmental impacts" -- It is about the Nitrogen Cascade - Nitrogen exposures, cycles, and loadings.	Renaming section is fine by Jim.
11)	p. 24, lines 16-25	This is a very minimal discussion of impacts -- the Exec Summary has more information. Report seems out of balance -- suggest saying that this report doesn't explore these impacts in depth, that it takes these impacts as a given...	Table A could be included here and Jim agrees that report should say something to the effect that impacts are well known.
12)	p. 26	Figure 3--Page 26, line 8, what does it mean to "examine the relative sizes of the various...systems where NR is stored"? Page 27, line 6-9, text reads "The ovals showing...reflect that Nr is actively transported and transformed and that as a consequence there are significant impacts on ecosystem productivity due to fertilization and acidification, often with resulting losses of biodiversity" -- graphic doesn't show those impacts.	Jim will address
13)	p. 27	Rename section 1.2 something like "Overview of historical and current EPA research and risk management programs related to Nr"	Fine with Jim

	<b>Page</b>	<b>Issue</b>	<b>Suggested action item</b>
14)	p. 28-29	Brief text from Reducing Risk and following sentence seems more attuned to recommendations than description of current programs. Suggestion: move to section 3.4 and use it to introduce over-arching recommendation C	Tom: BUILD INTO RECOMMENDATION C
15)	p. 30	Suggestion -- add sentence/discussion of how the INC used input from different public groups listed.	Angela. fine; please write the material.
16)	p. 31-32	Hard to understand Table 1, compared to Figure 2 - Figure 2 seems to indicate that Total Atmospheric inputs total 10.2, not 10.0 Tg - Table 1 totals Nr inputs to the Aquatic environmental system as surface water; figure 2 refers to "coastal waters" - should the same language be used? Both total 4.8	The first bullet can be fixed (Jim) if it is not a Rounding artifact. The second bullet can be fixed (Jim).
17)	p. 32	p. 37 refers to table 1 line 10 as "cultivation-induced BNF" Table 1 refers to this line as "N fixation in cultivated croplands" -- the reference should be standard -- otherwise it's confusing.	Angela. I agree; please do a word search and make THE CONSISTENT WORDING AS "N FIXATION IN CULTIVATED CROPLANDS"
18)		Out of balance section 2.2.2. and 2.2.3. 2.2.2 much less detailed and has no recommendations or findings	
19)	p. 49	Recommendation 4 is not action-oriented. It looks more like a finding than a recommendation. How about a recommendation that EPA address this issue in its the triennial <i>Reports to</i>	Otto provided new finding 4 comment provided immediately before the teleconference.  KEN WILL PROVIDE DRAFT TEXT INCORPORATING THE EISA

	<b>Page</b>	<b>Issue</b>	<b>Suggested action item</b>
		<i>Congress, required by EISA, first report being due in 2010?</i>	RECOMMENDATION
20)	p. 53	2nd full paragraph seems out of place -- it relates to adverse impacts generally, not adverse effects on nitrogen use efficiency -- shouldn't it go in section 2.4? The report would be strengthened if discussion of impacts appeared in a more central place and was more fully developed.	This suggestion is fine with Jim. Angela, please flag Viney to make the change.  TOM WILL MOVE TEXT TO 2.4
21)	p.53, line and and p 54, line 5	Clarify finding and recommendation 5 pertain to "animal agricultural emissions" not just "agricultural emissions"	NO CHANGE
22)	p. 57	Why does recommendation 6 refer to phosphorus load issues? Doesn't seem connected to section text	VINEY -- ADD PARAGRAPH IN LIFESTOCK SECTION TO CONVEY THAT MANAGING MANURE FOR ENVIRONMENTAL CONCERNS INVOLVES MANAGING FOR BOTH NITROGEN AND PHOSPHORUS CONTENT -- ADD REFERENCE TO LEAD TO RECOMMENDATION 6
23)	p. 60  p.61	Concern about text introducing section 2.3.1.1, i.e., "The magnitude and mechanisms of Nr deposition to the Earth's surface remain major unanswered environmental questions for the US," -- Major Uncertainty is introduced abruptly here -- the Executive summary takes a different tone. Hard to know what is covered here and how it relates to the major findings. --Generally uncertainties are discussed, but	OTTO WILL PROVIDE SENTENCE FOR EXECUTIVE SUMMARY ABOUT UNCERTAINTY (something along the following lines)... e.g., the Committee has made its best judgment, based on available data and models. here are the key uncertainties, but - we've done the best we can. Perhaps saying that there is a range of certainty about the magnitude of inputs; much less certainty about internal

	<b>Page</b>	<b>Issue</b>	<b>Suggested action item</b>
		report does not communicate clear conclusion about the importance of these uncertainties	transfers among systems; and less certainty about the effects of cascade....this text then can link to the need for research
24)	pp. 60-72	Section 2.3.1.1 pages 60-72 present too much background information. The major findings and recommendations are obscured by the detail. It's hard to track the major arguments and the level of detail is out of balance with other sections of the report. Suggestion -- move most of 2.3.1.1 to an appendix. Provide some introductory text to lead to the "conclusions on atmospheric deposition of Nr.	RUSS: WILL SUMMARIZE AND MOVE TO APPENDIX
25)	p. 63	Missing recommendation? EPA should pursue a rigorous analysis of the emissions and deposition data, including identifying monitors and methods that are consistent from the beginning to the end of the record, as indicated in Recommendation D.  - Report has no recommendation D	RUSS WILL PROVIDE TEXT FOR FINDING 8 AND CLARIFY TEXT
26)	p. 73	Finding 8 has a buried recommendation, which is not pulled out as a recommendation - should it be?, i.e.,  . The current NAAQS for NO <sub>2</sub> , as an indicator of the criteria pollutant "oxides of nitrogen," is inadequate to protect health and welfare. Serious consideration should be given to	Russ: WILL DEVELOP NEW SPECIFIC RECOMMENDATION (8a) RE: NO <sub>y</sub> OR TOTAL REACTIVE NITROGEN (INCLUDING ORGANIC AND REDUCED FORMS), BECOMING AN INDICATOR OF OXIDES OF NITROGEN AND PROVIDE SOME SUPPORTING RATIONALE, CITING CASAC REPORT ON NO <sub>x</sub> /SO <sub>x</sub>

	Page	Issue	Suggested action item
		replacing or supplementing the NO <sub>2</sub> measurements and standard with NO <sub>y</sub> .  Suggestion -- expand this discussion	SECONDARY STANDSARD  ADD RECOMMENDATION TO MONITOR NO <sub>y</sub> . WHEREVER NO <sub>2</sub> IS MONITORD
27)	p. 73	Recommendations 8d-g seem overly technical and not supported directly by finding 8 or preceding text.	Russ: WILL MAKE SINGLE RECOMMENDATION REGARDING RESEARCH B/C OF SUBSTANTIAL UNCERTAINTIES, THERE ARE SOME RESEARCH NEEDS AND SUBSUME 8d-g.
28)	p. 74	Difficult to track discussion in first full paragraph with table 13, i.e., 9.7 (not 9) Tg N	GET CHANGES FOR 2.3.1.2 GET INTEGRATED INTO DRAFT
29)	p. 74 p. 75	Should units be Tg N/yr?	Angela. Yes, make the change.
30)	p. 77 and first paragraph on p. 78 first two paragraphs on page 79	NR aquatic system impact discussion p. 77 -- why is it included in section 2.3.1.3?	TOM-- MOVE ITALICIZED TEXT ON PAGE 77 AND OTHER IMPACTS-SPECIFIC TEXT TO PAGE 92, SECTION 2.43 AND SEND WITH ARVIN AND HANS FOR COMMENT
31)	p. 96	Finding and recommendation 14 seem to be in the wrong place -- they relate to water programs broadly, not section 2.4.3.4	AN: Suggestion, move it before section 2.4.3.3 -- it seems out of place in 2.4.3.4 <b>Paul Stacey: Please respond</b>
32)	p.97-98	Recommendation 98 not clear and potentially problematic <b><u>Finding 1</u></b>  Meeting Nr management goals for estuaries,	AN: Language on page 97, lines 4-5 indicates that targets exceed nitrogen goals. Finding and recommendation 15 either are very general or seem to call for reductions in current targets. Is

	Page	Issue	Suggested action item
		<p>when a balance should be struck between economic, societal and environmental needs, under current federal law seems unlikely. Enforceable authorities over nonpoint source, stormwater, air (in terms of critical loads), and land use are not adequate to support necessary Nr controls. Funding programs are presently inadequate to meet existing pollution control needs. Furthermore, new technologies and management approaches are required to meet ambitious Nr control needs aimed at restoring national water quality.</p> <p><b>Recommendation 15.</b> <i>INC recommends that EPA reevaluate water quality management approaches to ensure Nr management goals are attainable, enforceable, and affordable and that monitoring and research are adequate to problem definition and resolution, particularly in the development of nitrogen removal technologies. This may require changes in the way EPA sets water quality criteria and some compromises in ecosystem goals to accommodate human uses of the air, land and water.</i></p>	<p>that what the INC wants?  <b>Paul Stacey: Please respond</b></p>
33)	p. 98	Major point of text box 3 not clear	<p>AN: what is the take away message about how well TMDLs work? It shows how a TMDL is being used in a place, but so what"?</p> <p><b>Paul Stacey: Please respond</b></p>

	<b>Page</b>	<b>Issue</b>	<b>Suggested action item</b>
34)	p. 99	Finding and recommendation 16 relates to monitoring generally, not water quality monitoring in particular and is not supported by text in 2.4.3.6. Suggestion: move it to section on monitoring more generally	AN: Suggestion -- a new section on monitoring generally could be created (i.e., 2.4.4 b used to flesh out Overarching recommendation C <b>Paul Stacey and INC: Please respond</b>
35)	p. 103	Where is the rationale for the recommendation that NO <sub>x</sub> emissions be decreased by 2 Tg N/yr?	RUSS DICKERSON ACTION ITEM -- SEE ITEM 43
36)	p. 104	Description of biodiversity limited and somewhat general. Would be useful to have more specifics.	Jim. add additional refs so the reader Can get the details.
37)	p.95 p. 105	Discussion of critical loads and thresholds not focused. Unclear whether committee is using the two concepts interchangeably  p. 95 states Unlike the TMDL, the CL (in the US) has no regulatory framework but rather sets the threshold of Nr loading at which negative impacts have been documented.  p. 105 states " thresholds in general and critical loads specifically for Nr effects on terrestrial ecosystems in the United States should be understood to be “quantitative estimates of exposure to air concentrations of Nr compounds below which harmful effects on specified sensitive elements within ecosystem of concern do not occur according to present knowledge”(Nilsson and Grennfelt, 1988; Heittelingh et al, 2001). "	Jim. Make consistent.

	<b>Page</b>	<b>Issue</b>	<b>Suggested action item</b>
38)	p. 114	What's the bottom line of section 2.4.7.2? reader is left hanging	LEAVE IT AS IT IS
39)	p. 114-16	Make two last paragraphs in 2.4.7.3 the primary thrust of section -- move supporting science later or put in footnote. Point is lost otherwise.	ARVIN WILL CONSIDER ADDING A FEW WORDS AND REARRANGING TEXT...TO CONVEY THE IMPORTANCE OF THE CHEMISTRY TO THE TRADE-OFFS DISCUSSED
40)	p. 136, line 16	Reference to 36 Tg of new nitrogen in Table 1 doesn't seem to track	Jim will change and use Figure 1 as the ref.
41)	p. 140	Section title "Managing Nr during recycling through livestock production." hard to understand. Why not use plainer language, maybe something like "Managing Nr associated with animal waste resulting from livestock production"	Tom: OK
42)	p. 140, line 22 and pages 140-141	There is no synthesis communicated about the state of knowledge about a key scientific point in the report (how much is known about N in urea can be converted to N <sub>2</sub> .) The text and long quote are distracting and reader comes away with no sense of the bottom line. Suggestion: summarize the research and bottom line much more succinctly.	VINEY AND ARVIN WILL REVISE TO MAKE MINOR CLARIFICATIONS
43)	p. 147, line 20-21	Where is the citation for estimated reduction possible for coal-fired plants? A key piece supporting the target recommendation	JOANNE WILL PROVIDE CITATIONS FOR P. 147, P. 15-34; RUSS WILL PROVIDE REFERENCE FOR PAGES 35-39.
	line 30	Where is citation asserting an 80-90% reduction for off road vehicles is technically achievable?	RUSS WILL SEND SOME CORRECTED INFORMATION FOR NO <sub>x</sub> SIP CALL

	Page	Issue	Suggested action item
		Why does the committee assume a 40% reduction for off-road sources? Where is rationale?	ANGELA WILL SEND CITATIONS FOR RUSS TO CONSIDER FOR CITING CASAC LEVEL
44)	p. 148, line 7	Where is the supporting logic and citations for finding that excess flows into streams rivers and coastal systems can be reduced by 20%?	TOM WILL IDENTIFY REFERENCES FOR FIRST PARAGRAPH UNDER TARGET GOAL 2.  SECOND PARAGRAPH, LINE 12, CHANGE "INC BELIEVES" TO "INC EXPECTS" AND SEND TO KEN TO CONTACT DON HEY AND BILL MITSCH FOR CITATIONS FOR WETLANDS JUSTIFICATION  KEN WILL PROVIDE INTERNAL REPORT REFERENCES FOR
45)	p. 148 Line . 12	Same question, re: "belief:" that crop N-uptake efficiency can be increased? - -where did the numbers come from	KEN WILL CHANGE SECOND PARAGRAPH, LINE 12, CHANGE "INC BELIEVES" TO "INC EXPECTS" (AND ELSEWHERE) AND ADD REFERENCES  OTTO WILL IDENTIFY REFERENCES ON LAND USE. HE AND TOM WILL SEND KEN TEXT
46)	p. 149	Explanation of how estimated decreases of NH <sub>3</sub> are calculated not clear -- and it's not clear how those decreases translate into target goals	VINEY AND ARVIN WILL PROVIDE REFERENCES AND EXPLANATION.  VINEY WILL PROVIDE TEXT FOR ES

	<b>Page</b>	<b>Issue</b>	<b>Suggested action item</b>
47)	p. 151	No discussion of rationale for target recommendation 4 -- how was target set?	Paul: Please respond
48)	p. 151	Not clear how reductions would result in 25% reduction from current levels	This is obvious; no change needed.
49)	p. 158-171	Automated numbering system for findings needs to be turned off (findings are off by +20 in Appendix	Angela to fix
50)	Appendix	Sparrow figure should be reinserted -	ARVIN WILL FLAG WHERE SPARROW FIGURE SHOULD BE INSERTED