

Topical Lunch – Robert Howarth
"Energy, Agriculture, and Environment in Rural New York."
November 16, 2010
12:00 – 1:00 PM
300 Rice Hall

Attendees

Host – Bob Howarth, rwh2
Helene Schember, hrs6
Johannes Lehmann, cl273
Peter Woodbury, peterwoodbury@cornell.edu
Drew Harvell, cdh5
Brian Chabot, bfc1
Tom Butler, tjb2
Brian Richards, bkr2
Alexis Saba, aes324
Renee Santoro, rls75
Roxanne Marino, rmm3
Jed Sparks, jps66
Bongghi Hong, bh43
Nathali Neal, nln23
M. Todd Walter, mtw5
Al George, arg2
Christy Goodale, clg33
Miguel Gomez, mig7
Dennis Swaney, dps1
Karl Czymmek, kjc12
Quirine Ketterings, qmk2
Tammo Steenhuis, tss1
Anthony Hay, agh5
Zhen Han, hanzhen.zju@gmail.com
Monica Touesnard, mat59
Terry Jordan, tej1
Frank DiSalvo, fjd3
Dave Dieterich, dd355
Mark Lawrence, mal64
Larry Brown, ldb7
Tony Hay, agh5

Regrets

Alice Pell, a.pell@cornell.edu
Mark Bain, Mark_Bain@me.com
Chris Barrett, cbb2
Jery Stedinger, jrs5
Dick Schuler, res1
Chuck Greene, chg2
Jeff Tester, jwt54
Linda Wagenet, lpw2

Gregory Poe, glp2
Andrew Hunter, andrew.hunter@cornell.edu
Jan Nyrop, jpn2

Summary of Discussion

Bob Howarth:

Opened discussion with overview of the Agricultural, Energy, and Environment Program (AEEP)

- PIs: Johannes Lehmann, Roxanne Marino, and Susan Riha
- Focus on water quality (and greenhouse gas emissions) from agriculture, biofuels, and Marcellus shale gas.
- Target areas: Susquehanna River Basin (affecting Chesapeake Bay), Finger Lakes, rural NY.
- Ear marked funding – varies year to year
- Funds research, not extension; emphasis on biogeosciences
- Year to year fluctuation in available funds makes it desirable to match with other funds.
- Funding is limited to CALS
- Grew out of AEP, the Agricultural Ecosystems Program
- Following recommendation of faculty committee report, Dean Susan Henry appointed Howarth as project director 5 years ago, with Johannes Lehmann, Alice Pell, and Roxanne Marino as co-PIs. Susan Riha replaced Alice Pell 2 years ago, when Alice became vice provost.
- 250 faculty, staff, and students (including all faculty and staff funded by AEP in previous 5 years and all ACSF faculty fellows) invited to this ACSF lunch, to help discuss future of AEEP and related project.

Context for current and future activities of AEEP:

- Chesapeake Bay TMDL (nitrogen, phosphorus, sediment); agriculture, vs. nitrogen deposition from fossil fuels;
- Biofuels, corn (including indirect pressures on area planted), alternatives (switchgrass), relationship to CAFOs
- Marcellus shale gas development (water quality, particularly as it relates to TMDL; greenhouse gas emissions?)

Topics suggested by Howarth for future AEEP activities:

- better handle on deposition, particularly ammonia (redistribution of N from animal agriculture)
- biochar and retention of phosphorus
- greenhouse gas fluxes from biofuels (N₂O, switchgrass)
- ethanol plants as CAFO magnets, with associated water and air quality issues
- drainage, roadside ditching (nitrogen retention in landscape, erosion in ditches, but also increased kinetic energy of water leading to downstream bank erosion)
- agricultural management practices, in context of meeting TMDL
- Marcellus shale gas water quality and relation to TMDL (erosion, nitrogen deposition); USGS study
- Marcellus shale gas methane emissions (field work)

Howarth invited other topics from lunch participants, but no new topics emerged from discussion.

Past, Current, and Future Research under AEEP:

Brian Chabot: The AEEP and AEP is apparently a descendent of the earlier Ecosystem Research Center (ERC) from the 1980s, which had a fairly broad environmental mandate, and was not limited to CALS research even though it had an “agricultural tag”(according to Brian, AEEP is not limited either).

Jed Sparks: Research in atmospheric deposition (field methods) has been funded under AEEP. Current work includes $^{15}\text{NH}_3$ tracer experiments to get at NH_3 transport distances, micrometeorological techniques (eddy covariance - EC) to improve flux estimates and deposition velocities beyond the plot scale (the turbulence field effectively increases the scale of sampling: the higher the sampling tower, the larger the sampling scale).

Johannes Lehmann: Biochar and associated P retention is an active area of work, which extends to nutrient trading issues (analogous to carbon trading and already being implemented in PA) (e.g. converting animal manure into biochar, making it more easily shippable). Biochar sequestration of nutrients could be valuable in reducing nutrient load in this context .

Brian Richards: not currently funded within AEEP, but have NIFA funding to examine greenhouse gas emissions from biofuel plantations, including:

- field-scale trials on effect of species (switchgrass vs reed canary grass) estimated using EC and chamber methods on a Cornell site. The site (16-20 acres) has room to host other instruments for collaborative work, if interested
- Additional field scale trials on marginal soils (collaborator: Beneterra Agritech)
- Spatial tools to extend findings to multiscale assessments

Nathali Neal: CAFO studies in Oswego County. Bion Environmental Technologies is planning a combination 72000-head beef cattle finishing plant/methane digester/ethanol plant using their patented waste treatment technology. Carl Czymmek says that this project has been moved to PA. Nathali says their prototype operation is in PA.

Bob Howarth: Additional Research Areas

- drainage, roadside ditches (N retention and erosion implications relevant to TMDLs)
- ag management practices (obviously relevant to TMDLs)
- Marcellus shale water quality issues - TMDL implications related to site clearing (erosion, sediment) and effects on increased N deposition, etc (currently not funding this, but open to consideration)
- Marcellus shale methane gas emissions- field work (EC and other methods useful to estimate NH_3 fluxes) could be useful to reduce uncertainty in greenhouse gas emissions from gas operations.

Discussion:

Johannes Lehmann: How focused should the proposal be? Should we first choose the focus and then look at projects that fall under that focus? Or should we see what people’s research interests are and then choose proposal focus or foci?

Bob Howarth: We should be looking at large scale projects...

Peter Woodbury: TMDL process - what is it and how can it be improved?

Bob Howarth: Total Max Daily Load (N, P, sediment load) In the Chesapeake, it is largely based on the poorly regarded Chesapeake Bay Model...opportunities exist for improvement. By December 1st, states must have plan to meet TMDL targets.

Brian Richards: Working on proposal with folks at Purdue on NE dairies emissions cap (dairies and bioenergy production). Large scale proposal set for next summer... opportunities for collaboration.

Peter Woodbury: Hatch grant may overlap with Purdue proposal.

Karl Czymmek: TMDL, Upper Susquehanna: Have had a lot of discussion with EPA on regulation standards. Karl and Quirine Ketterings have worked to change the way EPA has represented NY and its loading rates. We need to improve our understanding of loading rates in the upper Susquehanna and make a connection between what is actually coming out of farms and large scale impact.

Roxanne Marino: at least in New York, it appears shale-gas development may be exempt from stormwater regulation.

Anthony Hay: What about organics? The organics issue exists outside the TMDL issue, which only relates to N, P and sediments, but is still of interest. USGS interested in doing some work on this.

Tammo Steenhuis: Cayuga Lake basin should be considered along with Susquehanna. Effectively, pollutants don't leave the basin (trapped in the Lake) as opposed to Susquehanna, where they flow to the ocean. This could be a huge issue for some pollutants from shale-gas development.

Peter Woodbury: AEEP proposal should not have single focus but rather two or three specific foci within broader goals.

Drew Harvell: Susan Riha wants to organize topical lunch for next semester on Marcellus Shale which may be another good time to revisit some of these discussions. ACSF may be willing to help with grants to help offset year to year fluctuation in AEEP funding.

Larry Brown: would it be worthwhile to try to get the finger-print of methane, in addition to measuring fluxes?

Quirine Ketterings: How do we connect plot scale to large scale and connect that to TMDL?

Peter Woodbury: We need to bring together the management of air quality and water quality in agricultural management practices and work to bridge the gap between extension work and science.

Bob Howarth: We have a pretty good handle on county scale fluxes (at least for N) but improvements can be made based on detailed knowledge of practices.

Quirine Ketterings: P is reasonably well balanced, but an N deficit exists in some places, due to a mismatch in distribution between sources (manure) and sinks (crops). Problem of getting the nutrients to the crop before volatile (or other) losses. More discussion needed.

Tony Hay: Water quality concerns from Marcellus shale development need more attention, particularly from toxic substances.