2004 SERA-IEG 17 ANNUAL MEETINGS

New Bern, North Carolina, July 20-22
Hosted by North Carolina State University

GENERAL SESSION

Welcoming Remarks
Greg Mullins (Virginia Tech), SERA-17 Chair
SERA-17 recently passed its 5-yr review. Advisors for SERA-17 now include Steve Hodges (Virginia Tech) and Mike French (University Arkansas).

Trends in the Development and Implementation of P Indices
Jennifer Weld (USDA-ARS), Doug Beegle (Penn State), Andrew Sharpley and Peter Kleinman (USDA-ARS)
The P Index has now been adopted in 47 of 50 states. This presentation reviewed state P Indices based upon implementation of NRCS 590 standards and described major issues in implementation. Indices were categorized on the basis of structure and numerical output, highlighting growing trends in partitioning particulate P and dissolved P pathways as well as presentation of index output as estimation of edge-of-field P losses. Implementation of P Indices has produced a new array of challenges, from workload to training. In turn, regional and inter-agency alliances have developed to meet these challenges using consensus-based science.

North Carolina's P Loss Assessment Tool (PLAT): Introduction
Deanna Osmond and Rory Maguire (N.C. State)
North Carolina's unique P Index, PLAT, was developed with four initial objectives: (1) to represent the diversity of physiographic and cropping systems found in North Carolina; (2) to protect water quality; (3) to take advantage of North Carolina's long-term scientific databases; and (4) to quantify relative field P losses. The final PLAT rating is based on four P-loss pathways: erosion, runoff, leaching, and source. Although source losses are runoff losses, they were considered separate because of potential losses from the P sources. PLAT contains several unique factors including a sub-surface leaching variable derived from soil test P information at 28 inches depth, and a particulate P coefficient designed to reflect differences in P desorption from aluminum and iron minerals. Initial development of PLAT concluded with a review by top P Index authorities, and comments on this draft were considered in revising PLAT for release.

North Carolina's PLAT: Sensitivity Analysis
Amy Johnson and Deanna Osmond (N.C. State)
To anticipate the impact of PLAT on local agriculture, the tool was applied across North Carolina, using a county-level stratified random sampling to select individual fields. The number of fields selected for each county was dependent on the amount relative amount of agriculture. Approximately 1400 fields were surveyed, ranging from a low of 5 fields per county to a high of 37. Only 4% of the fields where the P source was fertilizer had PLAT ratings of High or Very High, compared to approximately 25% of the fields where animal waste was applied. This random sampling of fields confirmed that the PLAT did indeed detect highest P loss potential in counties with high animal concentrations.

North Carolina's PLAT: Validation

Wayne Skaggs and George Chescheir (N.C. State)

This study was designed to test the reliability of PLAT in predicting losses from drained, coastal plain soils. Data from two sites with field-scale runoff plots were compared with PLAT estimates. In general, PLAT underestimated total P losses from the plots, although trends in measured and predicted P losses were consistent.

Developing P Source Coefficients for the P Index

Frank Coale (Univ. Maryland) and Herschel Elliot (Penn State)

This presentation described part of a regional initiative by mid-Atlantic and northeastern states to coordinate P Index development efforts. The "Mule Barn" group has met regularly since 1999 to address collective concerns and pre-empt cross-border clashes. Recently, there has been a focus on developing P Source Coefficients to differentiate between the relative availability of readily-soluble P to runoff water in land-applied P sources. The Mule Barn group decided that P Source Coefficients should focus solely on the properties of the applied P source, recognizing that applied source effects can be modified by soil properties, particularly when sources are incorporated. Using a "worst case scenario" approach, P Source Coefficients have been developed for various categories of P sources, with P Source Coefficients highly correlated with water extractable P in manures and biosolids. Ultimately, producers will be able to obtain P Source Coefficients from a simple water extractable P test.

Implementing RUSLE as Part of the P Index

Greg Mullins (Virginia Tech)

This presentation described the outcome of a "Mule Barn" meeting to explore the potential for simplifying RUSLE in the P Index. Nearly all P Indices employ RUSLE for erosion estimates, but it is also the most time-consuming step in the P Index. Three examples were presented to contrast simplification efforts. In Maryland, a simple erosion calculator has been developed, based upon RUSLE1, it is structured in tabular form and draws upon soil-specific information (NRCS's NASIS database) automatically linked to the Maryland P Index. In New York, fields on a single farm are grouped by soil, K and T to allow aggregated calculation of RUSLE. Virginia is exploring the potential to use default values in RUSLE, in lieu of requiring field visits by nutrient management planners. Virginia will develop county-specific databases that provide default RUSLE values on a soil map unit basis. In general, the use of default values has been viewed skeptically, particularly by NRCS (and by SERA17 members in comments following the presentation). However, Virginia may employ default values until field visits can be completed for all fields in the state. Other RUSLE concerns raised at the Mule Barn meeting include whether RUSLE should be calculated on an annual or multi-annual (rotational) basis. .

P Dynamics in Fresh Water Ecosystems

Bob Heath (Kent State)

This presentation provided a primer on the role of P in aquatic ecosystems. Building upon a simple model of P control on primary productivity of freshwaters, a variety of issues related to P and ecosystem response were highlighted. Differences in ecological

community structure with changing P concentrations were used to introduce the developing understanding of the role of inorganic and organic P compounds in eutrophication. The dual role of dissolved organic P as a source of P and C to bacteria was highlighted.

Adjusting Poultry Diets to Decrease P in Manure

Peter Plumsted and John Brake (N.C. State)

Improving the dietary P balance in livestock, particularly poultry, is critical to developing long-term solutions to P accumulation on livestock farms. A study investigating the role of adjusting feed P content in conjunction with phytase addition on manure P excretion was described. Use of phytase tends to improve P uptake and decrease total P excreted by broilers. However, in order to achieve significant gains in water extractable P excretion, dietary P must be carefully coordinated with phytase use. Diets that exceeded broiler P requirement (e.g., NRC) and included phytase did not improve water extractable P in litter relative to similar diets with no phytase. However, when diets were adjusted to match broiler P requirements, significant declines in water extractable P of litter were achieved with phytase supplementation.

SPECIAL SESSION – THE TULSA/POULTRY INTEGATORS LAW SUIT

Overview of the City of Tulsa vs. Poultry Integrator Law Suit

Sheri Herron (Eucha Spavinaw BMPs Inc.)

A law suit was filed in late 2001 by the City of Tulsa against a group of poultry producers and a sewage plant treating poultry abattoir waste. The focus of the suit was to protect drinking water supplies in the Eucha Spavinaw Watershed. The resulting agreement required: (1) joint P Index development by University Arkansas and Oklahoma State for the Watershed; (2) Watershed monitoring and enforcement; (3) formation of a nonprofit organization to provide various services to resident of the Watershed and promote grassroots efforts at water quality protection. Two Indices were submitted by the universities, both of which were seen as possessing limitations by the judge. The judge approved the temporary use of the index proposed by University of Arkansas over a trial period. A 300 mg/kg Mehlich-3 P threshold was set above which poultry litter applications are banned.

Eucha Spavinaw P Index (ESPI)

Tommy Daniel and Indrajeet Chaubey (Univ. Arkansas)

The University of Arkansas' ESPI was developed from the original Arkansas P Index for Pastures, modified to fit conditions specific to the Eucha Spavinaw Watershed. ESPI requires a 0-4 inch soil sample for soil P testing, mandated by the judge overseeing the Eucha Spavinaw lawsuit. A distinguishing feature of ESPI is the use of water extractable P application rate to evaluate the effects of recent poultry litter application on dissolved P losss in runoff. In addition, ESPI output is in the form of a risk based ranking. Recently, a visual basic interface was developed to facilitate/simplify use of ESPI by nutrient management planners.

Pasture P Management (PPM) Calculator

Dan Storm and Hailin Zhang (Oklahoma State)

Oklahoma State's PPM Calculator was developed specifically for the Eucha Spavinaw Watershed, based upon a modified version of the SWAT model. The PPM Calculator is calibrated with a 15 year climate database to develop edge of field estimates of total P loss in runoff. Some features in SWAT that are computationally demanding and not tied to edge-of-field P losses have been excluded from the Calculator. Because the model operates on a daily time step, output can be expressed on a monthly basis. A Visual Basic interface provides a simple interface for use by nutrient management planners.

Role of SERA-17 in P Management Conflicts

Greg Mullins (Virginia Tech)

SERA-17 has traditionally played a constructive role in providing consensus-based scientific input into discussions involving P management. As issues arise regarding P Index implementation, SERA-17 can serve as a forum for consensus-based scientific recommendations. To facilitate this role, parties involved in the law suit will develop summary papers that will highlight salient issues requiring scientific input. Key issues include (1) the use of index or loss-based estimates, (2) soil sampling depth, (3) P determination methods in manure analysis, (4) setting upper soil test P limits, (5) validation of P Indices, (6) relative merits of ESPI and PPM Calculator.

SERA-17 COMMITTEE MEETINGS

Transport Committee
Chaired by Peter Vadas and M.S. Srinivasan (USDA-ARS)
In 2004 the committee worked to develop a broad, annotated bibliography of studies address P transport. The bibliography is near completion. This committee plans to develop a "state of the science" report to be released as a white paper on the SERA-17 web site as well as to complete a review paper for possible publication in a peer reviewed journal.

Soil and Manure Testing Committee
Chaired by Dan Sullivan (Oregon State University)
The current focus of this committee is on developing a water extractable P test for manures that can be used in quantifying P Source Coefficients for the P Index. As part of this committee, Gary Pierzinski led a collaborative project to evaluate certain methodological aspects of manure P extraction with water. The results of that effort have been submitted for possible publication in Communications in Soil Science and Plant Analysis. A follow-up activity, led by Peter Kleinman, will examine some remaining manure extraction issues.

BMP Committee
Chaired by Forbes Walker (Univ. Tennessee), Philip Moore (USDA-ARS) and Chris Gross (USDA-NRCS)
This committee is finalizing BMP fact sheets. The peer review process is expected to be completed soon. When complete, fact sheets will be ready for web publication, likely via the SERA-17 web site. In addition, a source of funding for publication of paper copies is being pursued.

Modeling Committee
Chaired by David Radcliffe (Univ. Georgia) and Nathan Nelson (USDA-ARS)
This committee continues to work toward finalizing a draft of a book: "Modeling Phosphorus in the Environment: State of the Art." A January 1, 2005 deadline has been proposed for completion of a first draft of the book. An application for publication through CRC Press is pending.

Aquatic Ecology Committee
Chaired by Brian Haggard (USDA-ARS).
This committee has been rejuvenated by the presence of several aquatic ecologists at this year's SERA-17 meeting. Still, a critical mass remains elusive. Efforts are underway to recruit other aquatic ecologists, such as by continuing to highlight issues in aquatic ecology at the annual meetings and perhaps holding a joint symposium with one of the aquatic ecology professional societies.

BUSINESS MEETING

Incoming (2004-2005) Chair - Peter Kleinman (USDA-ARS)
The 2005 annual meeting will be held in Alberta, Canada, hosted by Alberta Agriculture, Food and Rural Development. The theme of the conference will be upscaling non-point source phosphorus research from laboratory to watershed. Cornell University has offered to host the SERA-17 meetings in 2005.

The SERA-17 web site will be upgraded this year, with a new committee consisting of Steve Hodges (Virginia Tech), Greg Mullins (Virginia Tech), Rory Maguire (North Carolina State University), Peter Kleinman (USDA-ARS) and Peter Vadas (USDA-ARS). SERA-17 committees will be requested to produce brief, annual "state of the science" reports, following any format suitable to the committee. A proposal to change the title of SERA-17 met with general enthusiasm. Ideas for a new title will be solicited through the list serve.

Rory Maguire (North Carolina State University) was elected secretary for 2004-2005 and will serve as chair in 2005-2006.