

# Agricultural Drainage Management Systems Task Force

Sept 12-13, 2006  
Champaign, Illinois

## Meeting Participants

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30. Richard Cooke	Univ of Illinois	rcooke@uiuc.edu
31. Gary Sands	Univ of Minnesota	grsands@umn.edu

## Introductions

Jim Fouss opened the meeting, and all participants introduced themselves.

## New publication “Questions and Answers About Drainage Water Management”

This new publication represents a collaborative effort of 10 authors from the Task Force. Jane Frankenberger discussed the publication, and distributed copies to meeting attendees. A total of 7500 copies were printed and will be distributed throughout the region and nationally to universities, NRCS, ARS, and industry.

Copies can be obtained through the following methods

1. Order from Purdue Extension, at <https://secure.agriculture.purdue.edu/store/item.asp?itemID=17465>. A packet of 20 is \$10 plus S&H. (Quantities less than 20 are not available.) You can also phone an order for WQ-44, to 1-888-EXT-INFO (1-888-398-4636). Email [mdchelp@agad.purdue.edu](mailto:mdchelp@agad.purdue.edu) if you have questions.
2. Print your own copies, at <http://www.ces.purdue.edu/extmedia/WQ/WQ-44.pdf>
3. ADMC members can contact Tade Sullivan for copies
4. Contact the authors in your state. (Minnesota: Gary Sands or Jeff Strock; Iowa: Matt Helmers or Dan Jaynes; Illinois: Richard Cooke; Indiana: Jane Frankenberger or Eileen Kladvko; Ohio: Larry Brown or Norm Fausey; Missouri: Kelly Nelson)

**Future questions and answers:** This publication answered fundamental questions on drainage water management that were brought up at the Task Force meeting in Iowa. Other questions, especially on design and installation, will come up as the practice is implemented. After discussion (the next morning), the **NRCS Water Management Engineers** agreed that they would take the lead on developing a method of responding to future questions. They will work with Ann Houser to put a method of asking and answering the questions in the ADMS TF Web site.

#### **State Reports - Status of Activities and Funding**

- *Iowa:* Kelly Thorp, Post-Doc at ARS, presented an overview of projects in Iowa. A new research site with treatments for conventional drainage, controlled drainage, shallow drainage, and no drainage has been installed at the Southeast Iowa research farm. Installation of instrumentation for continuous flow monitoring will be installed by mid-September 2006. A second site is expected to be established 30 miles northwest of Ames this Fall. Both of these sites are part of the CIG Iowa Plan of Work along with the two existing sites at Pekin, IA and Story City, IA. Kelly also reported on his work using 10 years of data collected at the Story City site to calibrate the RZWQM and DRAINMOD-N2 models. The calibrated models will be used to study water table management scenarios and to assess the benefits of controlled drainage across the range of Midwestern climates.
- *Illinois:* Richard Cooke reported on effect of sampling frequency on N load that was studied at one of the monitoring sites. Don Pitts reviewed the drainage water management systems that have been installed in Illinois over the years through the demonstration project. Of approximately 100, one has failed. He noted that although cost-share is available through EQIP, most applications rank fairly low because they have not dealt with all resource concerns, particularly wildlife. He also mentioned The Nature Conservancy CIG, which has installed two subirrigation projects. Because the fields are sloped, they do not qualify for NRCS cost-share programs.
- *Indiana:* Purdue's four paired drainage water management research and demonstration sites continue to be monitored. Jane Frankenberger presented some thoughts on changing the flow monitoring equipment to find a system to better measure the submerged outlet, low suspended solids drainage water. Acoustic Doppler sensors are not expected to work well because of the low suspended solids most of the year. Minnesota researchers have tested electromagnetic equipment, which appears to be functioning well in most conditions. Finding a perfect flow monitoring system was dubbed "the Holy Grail of

drainage research”. Installing two (or more) systems may be the best way to characterize flow under all conditions.

Mike Cox, NRCS Indiana State Engineer, reported that a few systems have been installed, and Indiana NRCS continues to study how best to work with this new practice.

- *Minnesota*: Gary Sands reported on new sites in three counties through existing and new Conservation Innovation Grants. Craig Schrader, a Regional Extension Educator who will be working with drainage, is providing additional expertise for this work.
- *Missouri*: John Sadler of USDA-ARS Cropping Systems and Water Quality Research reported on drainage ditch water quality. Both PO<sub>4</sub>-P and NO<sub>3</sub>-N are very low except for events. This shows the difference from subsurface drains, and in some cases also the effect of vegetated channels.
- *Ohio*: Norm Fausey reported that an additional NRCS CIG grant to and RC&D has developed an important state partnership, since all agencies are involved. He also discussed the Conservation Effects Assessment Project (CEAP) in the Big Walnut watershed. Barry Allred described current research.

## **Presentations**

### **Drainage Ditch Management Research on the Delmarva Peninsula**

Peter Kleinman provided an overview of a collaborative project focused on improved management of agricultural drainage ditches to control phosphorus and nitrogen losses from agricultural lands receiving poultry litter. The project involves three institutions – USDA-ARS, University Maryland Eastern Shore (UMES) and University Maryland (College Park) – with activities concentrated in the Manokin Watershed of Maryland. The research, initiated in 1999, ranges from replicated nutrient management experiments at plot and field scales (<0.1 ha), to drainage ditch experiments, to paired watershed experiments (200-500 ha) to catchment monitoring (~15 square km). Drainage ditch monitoring at the UMES research farm, a former broiler operation with ~30 years of intensive litter application to fields, has revealed a broad range of nutrient losses. In 1995 total P losses varied from 9 to 81 kg/ha across seven ditches, while total N losses ranged from 24-125 kg/ha. The highest losses were associated with point sources (barns, manure storage areas). Non-point source loadings to ditches appear to be primarily from sub-surface flow, with ditch sediments possibly contributing significantly to dissolved P losses and floating algal mats resulting in significant particulate and organic losses of nutrients. Experiments are underway to quantify the effects of clean outs, flow control structures and P-sorbing filters on ditch water quality. Paired watershed research is also planned in collaboration with University of Minnesota (Lamberton).

Joe Britt of Sand County Foundation talked about the Agricultural Incentives Project designed to reduce nitrate in the Midwest, funded primarily by NRCS. They have funded They have also hosted a summit on nutrient management and water quality. They are exploring ways to keep the discussion between farmers going, including a web log.

### **Conservation Security Program**

Dennis Carman gave an update on drainage water management (DWM) funded by the Conservation Security program (CSP). The payment rates for DWM range up to \$10 per acre for the highest DWM index. In 2005, there were 10,305 total contracts nationally, of which 500 included DWM. Nationally, 33 million acres were enrolled in CSP, of which 282,000 acres had DWM. Total payments for DWM were \$977,407, with an average DWM payments

of \$2000. The highest number of contracts were in California (285) and Arkansas (120), which primarily have surface drainage. The number of contracts in OH, IN, IL, IA, and MN was 0.

He then described the Demonstration and Data Collection Enhancement Program, which allows funding for drainage management data collection within CSP watersheds by producers enrolled in CSP. This is limited to 2004 and 2005 contracts, but planning could start now for 2006 contracts. Requirements are to install a water control structure that is remotely controllable, with automated water level sensing. A number of other data are required to be collected, including tillage methods, yield, etc. *Payment:* Producers receive an initial start-up cost of \$6000, annual payment of \$2000, and \$1000 for each field day held. The money goes to the farmer, but the farmer can buy help. Many farmers will choose the system called that sends data to a centralized web site accessible to the farmer. Several ADMS participants asked about quality assurance. Data will be provided to the state NRCS office.

### **Action Plan**

Mike Sullivan brought updated copies of the Action Plan. Item 3.3 is to “**Collect and maintain list of technical papers and related DWM information with web links, contacts, and means to obtain copies.**” Mark Weltz offered the USDA Water Quality Library to help with this task. Joe Makuch, Water Quality Librarian, could develop a bibliography. ADMSTF members provide keywords, the list gets developed, and then it gets automatically updated. (Funding for this originates from NRCS CEAP.) This will be complementary to the literature review being developed by Gary Sands and others, which will provide synthesis.

**Action:** **Pat Willey** will arrange a teleconference with Gary Sands, Katie Flahive, Jerry Walker, Dennis Carman, ARS (Norm Fausey or Jim Fouss), and Joe Makuch. One possibility is to meet with Joe Makuch at the Tri-Society meeting in Indianapolis in November.

### **Field Trip**

Richard Cooke and Don Pitts organized a field trip to several sites near Colfax. The project site showed the combination of drainage water management (controlled-drainage) combined with a Bio-Filter or Reactor on the outlet pipe of the water table control structure. Since the first Bio-Filter installed at the site had the wood chips compacted a considerable amount, it did not work as well as where the wood chips were dumped into the drain outlet trench and not compacted. Thus, it was recommended by the group that the wood chips in first trench be dug out and replaced with new chips, but without compaction. The group saw the bioreactor data collection, and also a new integrated sensor that communicates via with satellites with the field instrumentation.

## **Wednesday**

### **Mark Weltz, National Program Leader, ARS**

Mark Weltz spoke on the NP 201 Water Resource Management. Drainage management is one of the key areas. In fact, of the \$65 million appropriated, \$4 million is for drainage management. He also reviewed the new ARS STEWARDS database, led by Jean Steiner and John Sadler as science advisors. NASA will integrate the STEWARDS data system up to an umbrella system that can read from multiple sources. There is a new National Program Leader replacing Dale Bucks, but Mark will continue to represent ARS in the ADMS Task Force.

## **NRCS Conservation Innovation Grant**

Tade Sullivan reviewed this grant, which is the largest Conservation Innovation Grant awarded in 2006. The ADMC is the lead organization, with other major organizations being the Minnesota Department of Agriculture, Univ. of Minnesota, Iowa State Univ., U of Illinois, Purdue Univ., Ohio State, and ARS. The contract will signed between NRCS and ADMC later in September, and then there will be subcontracts to the other organizations to fund the demonstrations sites in each of the five states. Matching funds totaling approximately \$950,000 were provide by the Minnesota Dept. of Agriculture, each university, and the ADMC.

The goal is that at the end of the project enough information will have been collected that region-wide recommendations can be made. The project team is just beginning to communicate on the details of how the project will work.

Some research questions were discussed, including whether surface runoff would be collected. While this would be desirable, it was considered to be beyond the scope of this project which will fund drainage measurements. Other funding will continue to be sought to account for the rest of the water balance, including both surface runoff and deep or lateral seepage. The method of measuring nitrate concentrations will be selected in each state, depending on available resources.

## **EPA Update**

Katie Flahive discussed the progress of the Hypoxia Task Force and the new Science Advisory Board Panel. The following meetings are being held in the near future:

- Nov 7-9: Minneapolis. Sources, Fate and Transport of Nutrients in the Basin, Final or 4 Symposium
- Dec 6-7: 2<sup>nd</sup> Public Mtg of the SAB Panel: Outline of report
- January, Washington DC: TF public meeting
- March: Public meeting of SAB panel
- April: TF public meeting

She encouraged participants to go to the web site: [www.epa.gov/msbasin](http://www.epa.gov/msbasin). Click Task Force, then click *Reassessment* for documentation given to SAB Panel.

## **Modeling workshop**

Mike Sullivan discussed the Army Corps of Engineers Hybrid Watershed Water Quality Model Workshop that will be held in Alexandria VA, Sept 18-20. The goal is to develop a model for drained land, and Task Force members have suggested that they build on DRAINMOD. Wayne Skaggs was scheduled to attend this meeting, but Norm Fausey and Jim Fouss would not be attending.

## **Upcoming Meetings**

- October 11-13, 2006: Managing Agricultural Landscapes for Environmental Quality, Kansas City. Strengthening the Science Base. Soil and Water Conservation Society <http://www.swcs.org/index.cfm?nodeID=8409&audienceID=1>
- Oct 17-18, 2006. Ag and Hydrology Learning Network, The Nature Conservancy
- Oct 25-28, 2006. US Conference on Irrigation and Drainage, Boise Idaho. <http://www.uscid.org/06conf.html>

- Nov 28-30, 2006: Innovations in Reducing Nonpoint Source Pollution Conference. Indianapolis. The Rivers Institute at Hanover College.  
<http://www.riversinstitute.org/events/nonpointsource/index.php>.
- Nov. 12-16, 2006. ASA, CSSA, SSSA Annual Meeting, Indianapolis.  
<http://www.acsmeetings.org/>
- Jan 28-Feb 1, 2007. CSREES National Water Conference, Savannah Georgia.  
<http://www.soil.ncsu.edu/swetc/waterconf/2007/home07.htm>
- April 2007. National Conference on Ecosystem Restoration. Sponsored by USGS, NRCS, Corps. Focus on Mississippi Basin. <http://conference.ifas.ufl.edu/NCER2007/>

### **Next ADMS TF meeting**

NCR207 is meeting in North Carolina, probably in March. But combining a meeting has been quite long in the past. ADMS TF could hold a meeting in Washington DC or Beltsville, with a goal of getting more headquarters people and/or Congressional staff. Tade Sullivan will suggest possible dates. This could be either the Spring or Fall 2007 meeting. If anyone has comments, contact Jim Fouss or Mike Sullivan. Another possibility is Des Moines, IA.

### **Literature Review**

Gary Sands distributed a handout of references that will be included in the Water Table Management Literature Review. A surprising finding is that when a number of studies were combined, plotting managed vs. conventionally-drained volumes yielded a very strong relationship. These relationships will show up in the literature review, which will be available soon.

### **NRCS Standards**

Pat Willey reviewed the standards for drainage water management in each state. They differ considerably, and this document will provide useful background as the state standards start to be reviewed in coming years. Contact Pat for a copy of the document, or to participate in future reviews.

### **Web page**

A small group met by teleconference to suggest changes and updates to the ADMS Task Force Web site (<http://www.ag.ohio-state.edu/~usdasdru/ADMS/ADMSindex.htm>), and Ann Houser made them. The home page explains much more about the need, practices available, and the Task Force. The membership list has been updated. The new Extension publication (FAQ) will be linked from there. Participants are encouraged to visit the site, note the new items, and send any further suggestions to Ann.

The meeting was adjourned at 3 pm.

*Notes compiled by Jane Frankenberger, Purdue University  
Sept 14, 2006*