

Agricultural Drainage Management Systems Task Force

Columbus, Ohio
May 16-17, 2005

In attendance: (*listed alphabetically by first name*)

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Wayne Skaggs	NC State University	skaggs@eos.ncsu.edu

Opening comments

Jim Fouss and Mike Sullivan welcomed the group, particularly new participants. They stated that this is a good time to discuss where the group is headed.

Sheryl Kunickis reported that the ADMS task force was officially recognized as a technical work group of the Partnership Management Team (PMT). Dan Kugler of CSREES designated Jane Frankenberger as the official CSREES representative. The Task Force has been working two years on the charter, now is signed by representatives of ARS, NRCS, and CSREES (Al Dedrick, Larry Clark, Dan Kugler).

Jim Fouss passed out copies of a new draft of the ADMS brochure. He asked for comments by June 1, so that changes can go to Gary Sands who will do the final editing, formatting and printing. Help is needed with the picture of title crop residue cover. It should convey some kind of surface cover that would enhance filtration, like anchored residue or stubble crop.

State Reports

Iowa: Jeff Porter, NRCS, reported that they are in the process of approving standard 554. The practice is included in one of the CSP watersheds as an approved conservation incentive, but no takers yet. There is a landowner interested in DWM trying to get funding through Conservation Innovation Grants.

Illinois: Could not attend meeting.

Indiana: Jane Frankenberger reported on Purdue's CSREES-funded research/extension project called "Drainage Water Management Impacts on Watershed Nitrate Load, Soil Quality, and Farm Profitability". Control structures and monitoring systems have been installed at a Purdue University farm and three private farms. Eileen Kladivko is sampling soil and earthworms at these sites, so could not attend the ADMS meeting. Purdue researchers are currently working on figuring out how to install observation wells that will not interrupt farmers' field operations, while giving water table depths throughout the year. She asked for feedback on what depth the structures should be set at. Currently they are planning 2 feet. **Beth Clarizia** reported that NRCS approved the 554 standard 2 years ago, but no one has signed up for it yet. Most people have no idea what drainage water management is, so we are doing education.

Michigan: Could not attend meeting. Larry Brown stated that Michigan could be an important state, although the current personnel situation has not allowed them to participate. They have done quite a bit of water table control work, and that they have a site for harvesting drainage water, taking runoff from feedlot treated in a wetland, and used in subirrigation system.

Ohio: Art Brate said that NRCS Standard 554 was approved this winter and is on the Web site, and presentations on the practice have been made around the state.

- Norm Fausey described the new CREP watershed project in the Scioto River, a very large watershed including Columbus. Drainage water management is one of the approved practices, for 1000 acres. Each structure is estimated to treat $\frac{1}{2}$ acre for this purpose. Art Brate pointed out that since FSA is responsible, structures can only be cost-shared if in the buffer. If more structures are needed uphill, they

cannot be paid for by CREP funds. Also, there are no incentive funds for management through CREP, as can be made available through EQIP. An unanswered question is whether the structure should go at the upstream end of the buffer, or adjacent to the stream.

- Norm also reported that he is converting the Hoytville subirrigation site to explore the impact of various control structure heights.
- Barry Allred is leading an effort to add control structures to the existing Wetland-Reservoir-Sub-Irrigation System site.
- Larry Brown described a proposal to examine manure movement and gas emissions at the Waterman Farm. A report from the liquid manure in drained cropland conference will soon be available. Drain plugs are being promoted by some people as a solution to preferential flow of liquid manure through drain tiles. He also brought up the problem of roots in drains, which may be exacerbated with drainage water management.

Minnesota: Kent Rodelius of Prinsco gave some perspective. Sheryl Kunickis reported on efforts in the Red River Valley to install tile drainage, and also on the literature review being conducted by Gary Sands.

Missouri: Unable to attend meeting

Wisconsin: No report

Water Quality Success Stories in the Mississippi River Basin - Mike Sullivan (also speaking for Don Pitts)

Mike Sullivan presented various successes, including those in Louisiana, Missouri, Wisconsin, and Illinois.

At a recent meeting, the ADMS Task Force identified a need for guidance for demonstration projects. Don Pitts and Richard Cooke proposed “Recommendations for developing a DWM Demonstration Project”

- Field Scale
 - Identify areas of state with high nitrate levels
 - Identify counties with flat topography and a high density of sub-surface drainage
 - Develop education effort in high priority counties
 - Bring in extension specialist, contractors, TSPs, SWCDs, and NRCS DCs
 - Establish funding mechanisms for cost-share
- Monitor Some of the Field Scale Projects
 - Quantify water quality benefits
 - Develop in crop season management guidelines
 - Quantify yield impacts of DWM
- Work with contractors to design new drainage systems with DWM in mind – win the support of the drainage contractors!
- Work toward identifying watersheds where DWM can be implemented in the majority of a sub-watershed

After some discussion, **the consensus was that the group agrees with these recommendations.** They could be fine-tuned for the various states.

NRCS Conservation Innovation Grant (CIG) Projects Involving DWM

- Jack Huggins of The Nature Conservancy talked about the CIG project in Illinois to compare the effectiveness of drainage management and wetlands. They have two 10,000-acre watersheds side-by-side, which they have been working on for about 6 years. Many partners are participating, and this is an exciting opportunity to understand impacts of these two practices.
- Minnesota project. Mark Dittrich, who leads the project, was not present. Group members stated that there may be some issues with locating sites.

Activities update from NRCS

Pat Willey reported on an effort to find out the status on Practice 554 around the US.

- Ohio: Practice 554 recently approved
- Missouri: Practice 554 updated Oct. 2003.
- Indiana: Practice 554 updated April 2004
- Michigan: Practice 554 January 2003. Low level on installation, but interest is increasing for fields where liquid manure is applied. Mainly this is a good opportunity for implementation.
- Minnesota: Practice 554 August 2003
- Illinois: Practice 554 July 2002. About 40 sites.
- Wisconsin: Not currently using Practice 554. NRCS is not usually involved in drainage, except for defining wetlands.
- Iowa: Practice 554 not in FOTG

Score 6-2. Yes: OH, MO, IN, MI, IL, MN; No: WI, IA

NACD Position statement

The National Association of Conservation Districts passed a position statement called “Support for ADMS and ADMC demonstration projects” This is a significant accomplishment. Sheryl Kunickis and Charlie Schafer attended the NACD meeting to answer questions. One amendment was added on protecting confidentiality of producers. The statement is included below.

WR-1
Support for ADMS and ADMC Demonstration Projects
(Water Resources Committee)

A high percentage of the Midwestern States' agricultural cropland is sub-surfaced drained (tile drained). Drainage flow from these systems carries high concentrations of soluble plant nutrients and other chemicals, nitrates being the most prominent. These concentrations are viewed as an important factor in Total Maximum Daily Loads and in the growth of the hypoxic zone in the Gulf of Mexico.

Drainage water management can improve water quality by reducing the quantity of nutrient enriched drainage water leaving fields, and can provide production benefits by extending the period of time when soil water is available to plants.

The Agricultural Drainage Management Systems Task Force (ADMS) and the Agricultural Drainage Management Coalition (ADMC), with membership from various USDA agencies, EPA, and a number of academic and private sector interests, need conservation district cooperation and support at all levels (local, state, and national) in working with leaders at the state and district levels and with private individuals to assist in selecting sites for the demonstration of practices and engaging in a planning process to identify and test combinations of measures on individual fields/farms and at the watershed scale to demonstrate effectiveness and acceptability; NACD supports conservation district cooperation with ADMS and ADMC efforts and encourages districts to sponsor projects that showcase how producers are willing to voluntarily install conservation practices as individuals level and as groups at the watershed scale to demonstrate achievement of pollutant reduction under a non-regulatory setting with cost-sharing to offset economic disincentives. All steps will be taken to protect the confidentiality of any and all data collected on the individual landowner's property.

NACD supports conservation district cooperation with ADMS and ADMC efforts and encourages districts to sponsor projects that showcase how producers are willing to voluntarily install conservation practices as individuals and as groups at the watershed scale to demonstrate achievement of pollution reduction under a non-regulatory setting with cost-sharing to offset economic disincentives.

This will become an NACD position statement.

Passed unanimously by the Water Resources Committee, with one amendment, on 02/07/05. Passed unanimously by the Board of Directors, on 02/08/05.

Agricultural Drainage Management Coalition

Charlie Schafer introduced Tade Sullivan, new Executive Director of the ADMC. He has experience as a Hill staffer, Director of Legislative Affairs for FSA, and lobbyist with Corn Growers. The ADMC is reaching out to traditional (agricultural) and non-traditional partners such as Kellogg Foundation, National Mississippi River Museum, and Minnesota's Watershed Rally. Tade described current legislative efforts, and the support of some members of Congress for an appropriation for drainage management research. The next farm bill is starting to be discussed this year, and will be in full swing by 1996. The ADMC plans to continue partnership with ADMS, initiate ARS Pilot, complete state-by-state implementation of conservation standard 554, work to include broader base of supporters in coalition, and include drainage management in next farm bill. Email suggestions to tade@sullivanassociatesLLC.com.

Charlie said that ADMC plans a Web site that will include map with status of 554 in each state, and examples of implementation in various locations. Also, they are keeping current on TSP options. It would be good to build capacity of people to design the practice. Charlie noted that there have been several excellent articles, including one in Farm Industry News for which Larry Brown and Richard Cooke were interviewed. The ADMC is going back to members for additional financial support.

Needs of ADMC.

- Producers need agronomy information, and the height of the control structure. They look to researchers in ADMS for this information.

- We need credible yield information. We say that there are likely to be yield advantages, but producers say “Show me the data”.
- We need soil water holding capacity. How much water is available for the crop?
- Tri-fold brochure will be useful. Could the coalition print some brochures for their use?
- We need the regional extension bulletin
- We need more information shared with DCs and others. We plan to do “Grass-roots guerrilla marketing”

A discussion was held on the need to figure out how many acres we need to get under controlled drainage to make a difference. This work is needed and is talked about at every meeting, but has not been done.

Funding opportunities

NRCS:

Conservation Innovation Grants program has closed for this year. Projects funded by CIG have to be innovative, but the innovative aspect doesn't have to be the technology. The innovative aspect could be the approach.

Conservation Partnership Initiative may be a good opportunity for scaling some efforts up to the watershed scale.

CSREES: No funding opportunities relevant to drainage water management are currently open. Decisions will be made this summer on CEAP and integrated water quality project. Jane Frankenberger said that Regional projects (coordinated by EPA regions) are an important part of the CSREES Integrated Water Quality program. The regional project in EPA Region 5, called the Great Lakes Regional Team, has identified drainage water management as an emphasis area under the Nutrient Management Theme Team. She is coordinating this effort, and other ADMS members such as Gary Sands are participants.

EPA: Targeted watershed program is just closing. The Assessment and Watershed Protection Division (AWPD) grant program is another possible funding source (closed for this year.) Iowa received \$1 million in targeted watershed grant funds for work with DWM and wetlands. Need more discussion at next meeting about a framework for water quality trading.

Tuesday

John Torbert reported that drainage districts in Iowa do not currently have any water quality responsibilities, but districts and trustees are starting to get more involved in water quality. Legal expert suggests that if a “benefit” can be shown, drainage districts can work more broadly, including water-quality activities such as giving incentives for buffers or water quality monitoring. Drainage districts are existing watershed-based governance, that can play a role in the current emphasis on watershed-based activities and governance.

Jim Fouss asked for comments on the ADMS TF brochure. A figure caption was changed. There was a suggestion to include a brief mention of the role of surface drainage, as well as subsurface drainage.

Regional Extension Bulletin: Jane Frankenberger presented an update on the regional Extension publication on “Agricultural Management Strategies to Reduce Nitrate Losses”. This document will include a discussion of 10 in-field and downstream technologies that have the potential to reduce nitrate loss. It is expected to be ready in the fall.

Upcoming meetings of note to Task Force

- SWCS: Sheryl Kunickis reported on two symposia she is organizing on drainage management at the SWCS meeting in August.
- She was asked to submit information on the ADMSTF to the White House Cooperative Conservation meeting in August. (<http://www.conservation.ceq.gov/>) which will be an important meeting, by invitation only.
- ASAE meeting: At least two drainage research sessions, including one on liquid manure on drained crop land
- ARS Strategic planning meeting for water management in Denver, June 6-10. Drainage management research will be encouraged by a number of participants.
- Iowa State Field Day July 30(?)
- Upper Mississippi Basin Symposium: September 26-28 in Ames Iowa. Focus on science of nutrient fate and transport.
- Mississippi River Basin Nutrients Science Workshop. St. Louis, MO, Oct 4-6, 2005. Call for Abstracts (due July 1). <http://www.epa.gov/msbasin/new.htm>

Conservation Security Program and Drainage Water Management

Dennis Carman, national lead for water management in the CSP program presented an excellent overview of CSP and how drainage water management is being handled in CSP. He introduced Jerry Walker and Ron Gronwald, who are water management engineers at the regional centers. They focus on design issues, while Dennis focuses on watershed and policy issues. CSP’s purpose is different than previous programs.

- CSP’s purpose is not to fix. It is to reward farmers who are already doing a good job.
- EQIP provides assistance to install practices to fix things (“widget program”), while WRP and CRP facilitate land use changes and easements. EQIP uses the word “incentive”
- CSP uses the term “enhancement”, which is a dollar amount to reward a producer for going beyond the minimum. We need to define what the minimum “acceptable” level of drainage management is, which might be zero. Then payment could be something like \$2 to \$10 per acre for various levels of management per year for life on contract (5-10 years).
- In 2005 so far: 50,000 office contacts; 5600 appointment, 3300 found eligible. How many will receive funding? What about the expectations, and time spent, by those that do not receive funding?

Dennis then presented a spreadsheet that was developed to determine the enhancement payment. For the time being, the following four factors were included “as placeholders”:

- Drainage system quality factor
- Water control structure factor
- Drainage system automation factor

- Water table/root zone monitoring factor

These are combined to get an estimate of drainage water managed, which needs to be percentage, not total volume, because of variation by location. At this point, they don't try to analyze pounds of nitrogen saved, etc., because of uncertainties (research needs) and complexities (hard for producer to understand). The percent of drained water that is managed is converted(?) to a *drainage management index*. The drainage management index would be converted to enhancement payments.

Task Force members discussed the following questions:

- Should there be added payments for automation?
- Should depth of water management be brought in as a factor?

After animated discussion, the group asked Dennis to transform this interesting spreadsheet into a document that ADMS Task Force members could comment on.

Members should understand that the current level of detail is about right, and shouldn't be made more complex.

This year's method will be open until September or October, so there is an opportunity for more discussion at the ADMS August meeting. The group expressed a great deal of interest in spending more time discussing this important topic.

Update on Mississippi River/Gulf of Mexico Watershed Nutrient Task Force activities - Katie Flahive, EPA Office of Water

EPA Region 4 White Paper: Comments have been submitted, from peer reviewers (9) and the public (5). Region 4 is taking the lead on compiling and responding to comments.

Update will be available at web site (<http://www.epa.gov/msbasin>), which will be updated June 3. She also discussed the Mississippi River Basin Nutrients Science Workshop St. Louis, Missouri Oct 4-6. The focus is on fate and effect of nutrients in the Mississippi River Basin major rivers. Call for abstracts (due July 1) at <http://www.epa.gov/msbasin/new.htm>

Wetlands and drainage water recycling

Barry Allred spoke about the WRSIS sites at Defiance County and Van Wert County. They have found that the system increased yield and effectively removes nutrients and sediment from subsurface drainage and runoff. He also gave an overview of the new drainage management plots planned at Defiance, Ohio to determine the effect of various depths of drainage management.

Surface drainage management

Norm Fausey stated that we need to bring surface drainage into the discussion if we're going to be effective. Cover crops and residue management are options for improving drainage management. We need to educate farmers and others that all water does not have to be moved out immediately, but could be stored in ditches, etc. There will be resistance, and there is a real risk in the case of extreme events. He noted the exciting opportunities for the next twenty years to look seriously at these issues, including the assessment of social effects of retaining more water in the land and in the ditches. One concern is being able to get the water out fairly quickly when needed, which is even more

needed if water is retained. One issue is the size of the mains in existing and new drainage systems. Most subsurface drainage systems are currently designed for 3/8 inch drainage coefficient, which limits the speed that a saturated field can be drained.

Update on Surface drainage management in Cabin-Teele Subwatershed

Tim Appelboom, ARS, presented current research in managing drainage in open channel drainage networks. They are looking at reducing flow downstream for reducing nutrient loads and flooding.

The role of wetland restoration in the solution of water quality in the MOM Basin

John Day, LSU, presented an overview of hypoxia, the potential role of wetlands in addressing it, and the MOM applied research project.

NCR-207 and ADMS-TF meetings in August

The NCR-207 multi-state research committee, led by Chair Eileen Kladivko of Purdue University, will meet in Minnesota on August 15-17. Because Eileen, past-Chair Dan Jaynes, and meeting planner Gary Sands were all unable to attend, Jane Frankenberger reported briefly on the meeting. The Task Force will meet just following the NCR research meeting, August 17-18. The meeting will be in the Minneapolis-St. Paul area, with the exact location has not yet been determined. The researchers will discuss priority drainage management research needs, and welcome the list provided by the ADMC.

The drainage water quality field day at Lamberton, MN will be held on Friday, August 19, and TF members are invited to attend/participate.

DRAINMOD-NII Simulations

Wayne Skaggs is completing work on DRAINMOD-NII simulations for Midwestern sites, and will present the work at ASAE and SWCS this summer. He will present more at the August meeting. He also presented a detailed discussion of predicted yield effects of controlled drainage. For the Drummer soil in Illinois, the longterm benefit was 2.5%. But this masks the high variation from year to year. In some years, there will be a yield decrease. He showed predicted water table for controlled and free drainage for a good rainfall year where there was little benefit, a dry year where there was little benefit, a year where there was clear yield benefit and another one where controlled drainage caused a yield loss.

A discussion followed of drainage coefficient, and how systems need to have the capability to respond quickly after a major rainfall. Systems are being designed with drainage coefficient of ½ inch rather than 3/8 inch. This might be good to make managed drainage more flexible, but if drainage is not managed this could lead to more nitrogen discharge.

Suggested August meeting agenda items

Topic	Discussion Coordinator/Leader
Presentations from SWCS (shortened)	
Economic analyses	Larry Brown
DRAINMOD-NII	Wayne Skaggs
CSP Drainage Water Management work session. A suggestion that we could get the spreadsheet or other materials several weeks before the meeting, so make our review discussion more valuable. (Times from 2 to 5 hours were proposed for this, as a working session rather than primarily presentation)	Dennis Carman
Water quality trading and nitrogen. What approaches are being used, or are possible?	Katie Flahive
Education and outreach approaches to inform producers about research and options	Tade Sullivan
Review Action Plan -- are we on track? Should we update? (We could spend a little time on this at every meeting)	Mike Sullivan
Possible Topic: What is known about the impacts of drainage water management on liquid manure from drained crop land. Can this be another reason that can be promoted for using the practice?	
Forming a state agricultural drainage management system sub-task force. Who needs to be involved? How should these be formed and managed?	

Closing discussion and additional items:

- Rick Shamblen from Malcolm Pirnie discussed the analysis he is working on to compare options for treating nitrogen in a drinking water system. They are working with EPA to develop a conceptual matrix.
- Katie Flahive said that her office in EPA is very interested in supporting modeling efforts. She asked how DRAINMOD fits in with watershed models.
- Watershed-scale demonstration. How can they be implemented? How can they be funded? Need hundreds of thousands of dollars. Maybe several different sponsors including 319, CIG, industry, and others.

The meeting ended at 5:00 p.m.

Notes recorded by Jane Frankenberger, Assoc. Professor, Purdue University