

Agricultural Drainage Management Systems Task Force

New Orleans, Louisiana

November 18-19, 2004

In attendance:

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11. Eileen Kladvik, Purdue University, 765-494-6372, kladvik@purdue.edu
12. Gary Sands, University of Minnesota, 612-625-4756, grsands@umn.edu
13. James Fouss, USDA/ARS, 225-578-0743, jfouss@msa-stoneville.ars.usda.gov
14. Jane Frankenberger, Purdue University, 765-494-1194, frankenb@purdue.edu
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16. John Day, LSU School of Coast & Environment, johnday@lsu.edu
17. John Torbert, Iowa Drainage District Assoc, 515-221-1971, jtorbertidda@mchsi.com
18. Katie Flahive, USEPA – Water, 202-566-1206, flahive.katie@epa.gov
19. Larry Beran, TIAER, 254-968-9565, beran@tiaer.tarleton.edu
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33. Sam Kung, University of Wisconsin, 608-262-6530, kokung@wisc.edu
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35. Sheryl Kunickis, NRCS, 202-720-8723, sheryl.kunickis@usda.gov

36. Sonia Maassel Jacobsen, NRCS, 615-602-7879, sonia.jacobsen@mn.usda.gov
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40. Tom Davenport, EPA, 312-886-0209, davenport.thomas@epa.gov
41. Tom Spofford, NRCS, 202-720-6037, thomas.spofford@usda.gov
42. Wayne Skaggs, North Carolina State University, 919-515-6759, skaggs@eos.ncsu.edu
43. Wil Fontenot, NRCS, 337-291-7088, wildon.fontenot@usda.gov

Opening comments

Jim Fouss welcomed all participants. He described the NCR 207 Drainage Research Committee which had been meeting for 1.5 days previously and is complementary to the Task Force, which focuses on implementation. The Task Force will try to meet jointly with the annual NCR207 meeting again in the future.

Wil Fontenot welcomes first-time participants in ADMS Task Force meetings, who include the following:

- Katie Flahive - EPA
- Tom Davenport – EPA
- Jerry Walker - NRCS Central National Technology Support Center
- Lynn Kirsher - NRCS Central National Technology Support Center
- Shaun McKinney - NRCS West National Technology Support Center
- Sonia Jacobson – NRCS Minnesota
- Mark Jensen – NRCS Iowa
- Larry Beran – Texas Institute of Applied Environmental Research –
- Mike Sullivan – NRCS (Little Rock, AR); Wil’s replacement on the Task Force.

State Reports

- **Iowa:** Matt Helmers, Dan Jaynes, John Torbert, and Mark Jensen reported on the new EPA targeted watershed project, progress in finalizing the state 554 standard, and other drainage issues in Iowa.
- **Illinois:** Richard Cooke reported on the many projects he is involved with, funded by ARS Soil Drainage Research, Sand County Foundation, and EPA targeted watershed program, and others. One new aspect is combining drainage water management with bioreactors. He has set up sites around the state, including a 160-acre field that includes free drainage, drainage water management, and drainage water management with bioreactor. He has also hosted several tours, including the high-profile drainage tour with national NRCS staff that will be described later.
- **Indiana:** Jane Frankenberger reported on Purdue’s new CSREES Section 406 research/extension grant called “Drainage Water Management Impacts on Watershed Nitrate Load, Soil Quality, and Farm Profitability”
- **Ohio:** Norm Fausey described a state wide meeting hosted by Dean of the College at Ohio State University and state departments. The meeting was very successful, with representatives from DNR, Dept. of Health, Ohio EPA, drainage contractors, FSA,

NRCS, and AgriDrain. They have also made considerable progress with the Upper Big Walnut Creek watershed. Art Brate said that NRCS was finalizing the 554 practice with input from various agencies.

- **Minnesota:** Gary Sands described research and infrastructure around the state, including Waseca, a southwest center, and others. Many Minnesota producers are looking at subsurface drainage and alternative practices. Mark Dittrich reported on the bonding proposal to build drainage infrastructure and several projects that are getting started. They are also working on getting the 554 practice standard.
- **Wisconsin:** Sam Kung, Univ. of Wisconsin, reported on collaborative research efforts to identify a new method of defining soil hydraulic conductivity.

ADMS Coalition

- Charlie Shafer reviewed the many activities of the Coalition and Coalition members. At the summer meeting in St. Paul the Coalition had an opportunity to make a presentation to the NRCS national leadership team. He expressed appreciation for the support of task force members that come in and tell the story. Other recent events include a meeting in Iowa in August, Iowa Farm Fest, and the Minnesota-Iowa drainage forum. He is going to give a presentation to Minnesota LICA and the Illinois Drainage District Association. He described many other activities, and reported that the Coalition continues to seek support and funds. Peter Darbishire of Drainage Contractor magazine is interested in this practice, and devoted a significant part of the recent issue to Drainage Management Systems. (Some copies were passed out.)
- Steve Baker spoke of efforts to recruit more Coalition members. Some said the word “hypoxia” put producers off, but talking about water quality is more successful, since everyone wants to be known as good stewards. (Some discussion followed about the value of talking about hypoxia, and how perceptions differ among different audiences.) He also expressed the need for more support from agronomists, since some people say they will only support it if it is in the agronomy handbook.
- Barry Goodwin mentioned the Red River Valley area potential for drainage, and possibly drainage management
- Charlie emphasized that the Coalition is here to support the Task Force and its efforts. He also welcomes Mike to the new leadership role and wished Wil well.

Funding Sources

- CEAP: Dale Bucks, ARS, discussed the Conservation Effects Assessment Program (CEAP), and stated that a new CSREES request for proposals on CEAP will be out soon after the budget is passed.
- NRCS CIG: Mike Sullivan, NRCS, reported on the NRCS Conservation Innovation Grants and CIG: lessons learned from the first year (2004). It was suggested that a pre-proposal process be considered for use in the future to improve the screening process and limit time required on the front end by potential recipients.
- EPA: Tom Davenport, US EPA reported on the Nonpoint Source Program. He suggested that it was important to combine projects funded by EPA’s Watershed Initiative with longer-term research. Drainage water management cannot be paid for in most 319 projects because it’s not a state water quality practice. However, some

work related to drainage is being done, such as a project in Minnesota where rock inlets have been a very popular practice in a pilot watershed. He hopes that groups such as the NCR-207 Multi-state Research Committee would identify ways to do common reporting of BMP impacts.

- EPA: Katie Flahive brought up a new small grant program called the Assessment and Watershed Protection Division Program Grants. It is highly competitive - last year there were 310 preproposals and they funded 13. One of the priorities is watershed planning demonstration. Contact Katie at flahive.katie@epa.gov for more information.
- FSA: Sheryl Kunickis and Tom Spofford described a meeting with the Farm Service Agency (FSA) to concerning the installation of control structures in a buffer to allow for drainage water management. They brought up some issues concerning NRCS buffer standards, which are being considered.
- (This brought up lively discussion of the effectiveness of solid pipe in the buffer. Does it help with water quality? Also, is a waterway a buffer? Waterways need perforated pipe. Tom Spofford agreed to bring the draft standard the next day if possible).
- Philanthropy sector: Alex Echols suggested that although the environment currently receives only 3% of foundation and other philanthropy sector funding, there is interest in doing more with agricultural conservation.

Open Discussion

Dale Bucks and Sheryl Kunickis led an open discussion with the goal of assessing where we are at now and what we need to address. He told the group that we've accomplished more than anybody would have expected in a year and a half. No one was talking about drainage water management in the Midwest, and now they are. We need to figure out the next steps and what we need to do to achieve those.

- Wayne Skaggs reminded the group that if we are to have lasting success beyond a first flush of enthusiasm, we need a paradigm shift to *managing water tables*. In the past, drainage systems were put in and forgotten about for 30 years. But that can no longer be the case. We need to be convinced that it is as important to meet environmental benefits as production benefits. We need incentives or other means to help farmers realize that **they** receive as much benefit from reducing nitrate loss as increasing production. The ADMS Task Force will be a success if we can do that.
- We need to consider operation of control structures. History has shown us that when management practices are turned over to farmers they may not be operated for environmental benefits.
- Continued data collection beyond 3 years is needed. Many of the funded projects only have funding for 3 years.
- The ADMS Task Force should provide guidance on what a demonstration project should be.
- There was some discussion on current actions around hypoxia. Katie Flahive described the Interagency Hypoxia Task Force, which consists of nine federal agencies and nine states. The last meeting in Aug/Sept was in St. Paul, which started

planning for the 2005 reassessment. (A reassessment every five years is called for in the 2001 Action Plan.) This will be the main focus of the taskforce over the next year or so. The reassessment will be a five part program, and EPA will be looking to researchers to help. The Region 4 white paper will be peer-reviewed as part of the process. Members encouraged the Hypoxia Task Force to make the process as open as possible. Katie emphasized that the plan has not been finalized and no doors have been closed. They want to find what practices were developed over the past five years and were not included. Symposia on a number of topics next year may be part of it, and Task Force members would be welcome to participate.

LUNCH

Industry Led Solutions and ADMS

Larry Beran of TIAER made a presentation on Industry Led Solutions and ADMS, and how they can support the hypoxia action plan. ILS is a national coalition of leading producers in corn, soybean, rice, cotton, dairy, cattle, pork, poultry. Their objective is to develop, lead, and carry out a voluntary local basin-wide strategy of non-point source nutrient management in each state's critical watersheds, ultimately reducing the delivery of excess nutrients to the Gulf. They are using the Planned Intervention Micro-watershed Approach (PIMA).

Conservation Innovation Grants

Mark Dittrich of Minnesota Department of Agriculture talked about their new Conservation Innovation Grant, for local drainage water management. He thanked Wil Fontenot for pushing to get local partnerships. They will be working in Nicollet and Mower Counties in Minnesota. They are looking for demonstration farms, and have identified one promising site that needs a new drainage system. He asked for feedback on whether this is a good idea. He also talked about the possibility of subsurface drainage in the Red River Basin of the North, which is of current interest.

The Conservation Innovation Grant that will be going to The Nature Conservancy in Illinois, called "Quantitative comparison of the effects of controlled drainage versus constructed wetlands on water quality at a watershed scale" was briefly discussed by Pat Willey. The contact is Heather Collins in Chicago (hcollins@tnc.org). The project objective is to quantify and compare the effectiveness of controlled drainage management versus constructed tile wetlands at reducing nutrient and sediment concentrations in a 10,000-acre subwatershed of the Mackinaw River, Illinois.

Literature Review of Drainage Water Management

Gary Sands described plans for a literature review of drainage water management. Sheryl Kunickis obtained funding for this project through a reallocation funds designated for high priority research needs of the Partnership Management Team, which she leads. Gary will work with Matt Helmers and Richard Cooke to document what is known about the effectiveness of the practices, and to what extent they have been implemented. They will provide a white paper of the results, probably over the next year.

Multistate Research Committee

Dan Jaynes reported on the multi-state research committee *Drainage Design and Management Practices to Improve Water Quality* (NCR-207). The committee has been approved from Oct. 1, 2004 to Sept 30, 2009. It allows land-grant university experiment stations to pay for the travel of scientists, which allowed some to attend ADMS TF. In 2004, the Chair is Dan Jaynes and Secretary is Eileen Kladvko. Eileen will become Chair in 2005. Ramesh Kanwar of Iowa State University is Administrative Advisor. The next meeting is tentatively planned for August or September 2005 in Ames, Iowa. The membership is open to agency people or others interested in drainage research. Contact Dan Jaynes for more information.

SWCS Symposium and related opportunities

Sheryl Kunickis described the successful symposium held at the SWCS meeting in St. Paul, Minnesota in 2004. The 2005 SWCS meeting will be in Rochester NY, and she could organize another drainage symposium if there is enough interest. She invited Task Force members to talk with her about presenting papers. Many papers on drainage management were also presented at the ASA-CSSA-SSSA meetings in Portland OR. She also discussed other opportunities for drainage research such as ASAE. Gary Sands is organizing a session at the ASAE International Meeting called “Agricultural Drainage Management Systems: Subirrigation and Controlled Drainage” (http://www.asae.org/meetings/am2005/sessions_2.htm#223). Abstracts are due Dec. 1.

Watershed research in the Cabin-Teele Sub-watershed.

Tim Appelboom of the ARS Soil and Water Research Unit presented current watershed research in the Cabin-Teele sub-watershed, and how it relates to drainage management. They are looking at nitrogen reduction from instream processes and wetland diversions. They will be running AGNPS, and were fortunate to find excellent datasets from a regional airport within the watershed. Contact him at tappelboom@ars.usda.gov for more information.

Sand County Foundation

Alex Echols of the Sand County Foundation made a presentation on “Reducing nitrate contamination through market incentives”. Sand County Foundation is a small foundation in Madison, Wisconsin with operations throughout North America and Africa. They are very interested in agriculture drainage management as a tool for delivering enhancing environmental quality and improving delivery of conservation. He categorized nitrogen reduction techniques into agronomic practices, sink creation, crop diversification, and drainage management. His goal is to develop a matrix of load reductions and costs for the various practices.

Land Care

Alex had also volunteered at the last meeting to find out about Land Care. Mike Brubaker leads that effort, based in Lancaster County PA. The movement originated in Australia. A board is established, including farmers, agricultural organizations, lawyers, scientists, and others. For more information see <http://landcareus.org>.

Certificates of Appreciation

Jim Fouss and Wil Fontenot presented certificates made to honor **Fred Kollman** and **Bill Boyd** for their service to the ADMS. They have both moved on to other positions.

Jim Fouss presented a special certificate to **Wil Fontenot** thanking him for all his leadership and activities on behalf of the Task Force. Wil responded that he has never worked with a more action oriented, congenial group of people, and expressed thanks to be able to work together for a worthy cause.

Open Discussion *(continued from morning)*

An open discussion followed. The following are the notes as recorded at the meeting.

- Not a research initiative, a NRCS/CSREES/ARS Partnership Management Team
- Planning not always popular
- Stress differences in local, states, regional, and river basin goals and objectives
- Expand involvement with drainage districts, water districts, agricultural organizations
- Focus, expand and target pilot projects
- Economic strategy?
- Address the need for increased funding opportunities for drainage water management systems
- Data that supports environmental benefits for drainage water management
- Develop fact sheet on broad questions, keep it simple and limit to one page
- Interaction for discussing Riparian Buffer Standard on Friday afternoon for those sticking around
- Pay more attention to the Philanthropy Sector. There are sections within it that focus on the Agriculture sector. There is a lot of money out there.
- Shift and approach in the way we think to help the farmer
- Funding on demo projects is a major constraint. Three years of data and funding is not long enough.
- More farmers are liquidating their farms. There is a need to keep the soil there
- Value in having some guidance on demo projects from an interagency group
- Hypoxia/Gulf of Mexico issues

Industry Led Solutions (ILS)

- LMR SB Committee; ILS MOU
- Exchange information
- Producer Led
- Next meeting 2/23-2/23/05 Alexandria, VA
- Landcare – medium with coalition

Use of Webpage to provide information

- Add topics that come up – maybe a paragraph or two
- Need for a person to lead this effort
- Status of practice 554 in each state (Pat W.)
- Effects on groundwater
- Projects by State that are being represented on the committee (Each state; Ann)

- Link to 207 Committee (page exists)
- Posting of minutes from meetings (St. Paul – Wil, New Orleans – Jane)

Charter

- Never signed & finalized

Brochure

- Need better graphics and photos

Green Land to Blue Water

Charlie Schafer brought up the question of how we know when we're done. Some suggestions:

- When drainage management is a standard part of watershed management
- When we don't have significant outstanding questions (Currently, we haven't even figured out all the questions, let alone the answers)
- Drainage needs to be addressed in the 2007 Farm Bill. It was not mentioned in the 2002 Farm Bill.
- There is a need for continued dialog with the Partnership Management Team reporting progress and obtaining feedback regarding needs/expectations.

Surface Inlets

Mark Dittrich discussed surface inlets and handed out copies of the new Minnesota Department of Agriculture brochure "Managing Surface Inlets: Rock Filler as an Alternative". He said that farmers are very interested in this practice due to production benefits.

Friday, Nov. 19

Buffer standard and non-perforated pipe

Tom Spofford showed the current draft of the NRCS riparian buffer practice. FSA has asked that to ensure the efficacy of buffers, underground drains shall be replaced with rigid, non-perforated pipe. Many Task Force members raised questions about both the need for non-perforated and the need for it to be rigid. Tom said he would email the draft, and invited members to submit comments, particularly in a form that he could use in discussions.

DRAINMOD-NII results for Midwest soils

Wayne Skaggs introduced the DRAINMOD-NII results for Midwest soils. The goal is to complete testing of data sets in each of five states, working with local researchers, and to use the results to look at effects of design and management. He introduced Mohammed Youssef, the developer of DRAINMOD-NII, who gave a presentation called "Simulating N Dynamics in Drained Croplands Under Different Management Practices". Results were presented for simulations of the Drummer soil in Illinois. They looked at 5 spacings (5 m to 50 m), 3 depths (0.75 m to 1.25 m), and controlled vs. free drainage. Reductions in N loss due to controlled drainage were around 15%, less than the 40-50% reduction shown

in NC and Ohio. One factor may be that they were not simulating deep seepage. Wayne said that research is continuing. When asked if these results could be used to quantify N loss reductions for water quality trading, he said he would hesitate to use these to do so at this point.

Illinois Drainage Tour

Sheryl Kunickis and Steve Baker of Springfield Plastics reported on the very successful Illinois Drainage Tour and showed photos. There were between 40 and 50 participants, including national and state NRCS staff, non-governmental agencies, Congressional staff, and others. The NRCS State Office hosted, and introductory presentation were held at the office. The group visited five sites by bus. Stories on the tour appeared in Illinois AgriNews and Farm Week.

NRCS Leadership

Sheryl then introduced Merlin Bartz, NRCS Regional Assistant Chief for the Central Region. He expressed his appreciation for the Illinois drainage tour. He also gave an overview of recent USDA funding to support drainage water management, which include NRCS CIG projects (Minnesota and The Nature Conservancy), ARS CEAP watersheds, and the CSREES grant to Purdue University. He emphasized that production agriculture and environmental stewardship are not mutually exclusive. NRCS has an increase in funding, which gives an opportunity to do good things (along with growing pains). Currently they are thinking about how to incorporate drainage water management into the Conservation Security Program.

LSU Master Farmer Program

Donna Morgan of the LSU AgCenter presented an overview of the Master Farmer Program. This is a 3-phase education process that includes an 8-hour environmental stewardship training, a visit to a model farm, and development and implementation of a farm-specific comprehensive conservation plan for the farm. More information is available at <http://www.lsuagcenter.com> or by contacting her or the Master Farmer Program Coordinator, Carrie Castille Mendoza.

Restored and constructed wetlands in the Mississippi-Ohio-Missouri (MOM)

John Day of the LSU School of the Coast and Environment presented the need for restored and constructed wetlands in the Mississippi-Ohio-Missouri (MOM) basin. He pointed out that we need to find fiscal and political support for the billions of dollars that need to be spent to restore the nutrient balance.

The Role and Importance of Phosphorus on Hypoxia

Cliff Snyder of the Potash and Phosphate Institute made a presentation on “Nutrient use and hypoxia in the Gulf of Mexico.” He brought up the draft EPA Region 4 report which suggested that P discharge is the real concern. He emphasized that the year-to-year variability of the size of the hypoxic zone is more closely related to flow in the Mississippi than to nitrate concentration.

Nancy Rabalais of the Louisiana Universities Marine Consortium presented “The Role and Importance of Phosphorus on Hypoxia”. She stated that she has always emphasized that nitrogen, phosphorus, and silica are all important. Her talk showed the complex interrelationship between the nutrients, their ratios, and the size of the hypoxic zone. She also explained that the relationships among N, P and Si and their effects are becoming more complicated. Nutrient concentrations have stabilized in the last 20 years (N and P are double their former values, and Si is half), so flow does currently drive the flux. But the only way to reduce nutrient flux is to reduce the concentrations. The best predictive relationship for the size of the hypoxic area is the nitrate-N flux integrated over 75 days prior to the data collection.

Discussion

In response to questions about the economic impact of hypoxia, Nancy Rabalais said the data were not entirely clear. It has been shown that there is less benefit per unit effort in the shrimp and fisheries industries, but that may be due to other factors. A reporter for a local paper brought up a recent shrimp study that showed significant economic impact of the hypoxic zone.

There was some discussion about future scientific data needed. Katie Flahive reminded the group that the reassessment guided by the Hypoxia Task Force is a 5-part process. First is a peer review of the Region 4 EPA draft report. Then it will be a number of teams of scientists reviewing all available data.

The question of hormones, which have been found in the Mississippi River, was also brought up. Could they have an impact on the decline in fisheries? More study is needed.

Nancy Rabalais emphasized that the current nutrient, timing, and ratio between the nutrients is different than historic levels. For example, nitrate concentration used to remain more constant throughout the year rather than peaking in the spring. Getting closer to historic levels might be a goal.

The information that farmers are given from their fertilizer dealers regarding phosphorus levels was also questioned. For example, when they go in to order fertilizer they may be asked “How many bushels of corn do you want to raise this year?” Cliff replied that the PPI emphasizes agronomically optimum levels, but some dealers may not be giving this message. They need to do more to work with Certified Crop Advisors and dealers to stress optimum levels, not high levels.

Next meeting

Some discussion was held of when the next meeting might take place. The possibility of meeting after the CSREES water quality meeting in San Diego was suggested, but several key people could not attend. Several members felt the Task Force might not need to meet again until summer, since activity is going on around the country. The Research Committee (NCR-207) plans to meet in August or September in Iowa. Task Force leadership will consider what needs to be accomplished and plan for future meetings.

Friday Afternoon Discussion Session

Dale Bucks asked the question, “What kind of data or information does NRCS need from research or demonstration projects to promote Agricultural Drainage Management as a Best Management Practice, and provide cost sharing for its installation?”

Merlin Bartz, Tom Spofford, and Wil Fontenot provided most of the responses for NRCS. Information and data are needed in economic terms to document for the farmer the benefits of Ag Drainage Management; more or less the “bang for the bucks information.” If there is a yield benefit, this needs to be documented, and benefits of improved water quality need to be described in a way that the farmer will want to do it to get the credit for it; e.g., Nitrogen trading may be an important factor for the farmer, if it provides an economic incentive. It is important to show such benefits on a larger scale than just research plots or a field, for example in a sub-watershed or watershed scale is more effective in demonstrating the benefits of the ADM practice over the long-term.

It will also be important to show to the farmer the advantages and benefits for combining the various water management and conservation practices to improve water quality and reduce soil and agrochemical losses from his fields. For example, the combined use of drainage management along with conservation tillage, riparian buffer strips, and perhaps wetland areas through which drainage flows are diverted before discharging into larger ditches or streams.

Then the discussions turned to a question on how to obtain long-term funding for research or demonstration projects that would help answer these questions. It was noted that research grants are generally short-term, such as 1, 2, and 3 years, whereas the research needed, or demonstration projects, may require at least 5 years of data collection. It was suggested that the requests for funding needs to be made to Congress by interest groups such as farmers, farmer groups, or the agricultural industry. It as emphasized that the technical people in the field of drainage management and the other conservation practices need to provide information to these interest groups so that the proper requests or proposals can be made to congressional members. It was noted that the technical specialists could not address the needs directly to congress because of the Hatch Act restrictions, however, they can answer questions asked of them by members of the interest groups or congressional staffers.

Minutes submitted by Jane Frankenberger, Associate Professor, Purdue University