

## **ADMS Meeting – April 1-2, 2009 – Columbus, OH**

The meeting was opened by Norm Fausey and Jim Fouss. New participants were introduced, including Mike Shannon, ARS National Program Leader, Larry Chandler, ARS Midwest Area Director, and Kirk Hinds, ODNR. Terry Cosby, NRCS State Conservationist for Ohio welcomed the group. The agenda is appended to these notes.

### **Integrated Drainage and Wetland Landscape Systems in Iowa**

Matt Helmers, Iowa State University, presented a proposed program that will enhance drainage and wetland activities in Iowa. The pilot program is being pursued by the Iowa Department of Agriculture and Land Stewardship to accelerate the implementation of nitrate removal wetlands. It is built around the CREP wetland program, which has existed for some time. About 35 have been built so far, and 450 sites for landowner consideration have been identified. They have found that once landowners are contacted, about 50% have some interest and 50% of those proceed to engineering design, which seems positive. A study by NRCS and Iowa State in the 1980s found that most fields have adequate drainage intensity within the field, but almost all have limited outlet capacity. Some are designed with drainage coefficient  $< 0.25$  inch/day, some  $< 0.1$  in/day. This coefficient was reasonable at the time because was not all corn and soybeans, but is restrictive today. There is great interest in increasing outlet capacity, but some of the land is classified as “farmed wetlands”, and therefore drainage cannot be significantly enhanced without mitigation. Constructed wetlands at outlet can serve to mitigate the improved drainage of the farmed wetland. It may also reduce surface runoff resulting from the under-design. As drainage systems are replaced in coming decades, the vision is that the higher capacity system, together with wetlands at the outlets, will be an improvement. Discussions continue about this complex project.

### **Ohio’s Approach to Dealing with Failing Rural Drainage Infrastructure Needs**

David Hanselmann, Chief, Soil and Water Conservation, ODNR., discussed the multi-stakeholder process to address rural drainage systems. Two problems need to be addressed: Failing and aging drainage infrastructure, and environmental concerns and consequences. State laws defer to previously-constructed channels, but must take into account anti-degradation considerations. The Rural Drainage Advisory Committee proposed new rules that would water quality standards for channels draining less than 2 square miles. They are currently in the public review process.

### **2012 Census of Agriculture – Drainage Questions**

Dan Jaynes reviewed what has been done so far to try to get one or more drainage questions in the 2012 Ag Census. Dan encourages everyone to send an email to Mark Miller of NASS, who is director of the committee making decisions on census questions the Census, to explain how your agency will use this information. Dan will send contact information. Also encourage state agencies or others in your state to send an email.

Doug Toews mentioned that NASS sends out a crop questionnaire regularly, which has questions about drainage. However, this information has not been summarized on the NASS web site. (It might be helpful to also ask about this.)

## **Thoughts and overviews, especially concerning the impact of the 2009 economic recession**

Steve Slack, Director of the Ohio Agricultural Research and Development Center (OARDC) spoke about changes and opportunities at the federal level.

Louis McFarland, OLICA, presented thoughts from LICA. Jerry Biuso, National LICA Executive Director, was unable to be here.

Kevin Rapp, ADS, discussed economic impacts on the drainage industry. August-September 2007 was the start of a major downturn, due to fewer subdivisions and septic systems. The commercial market is still down, but the agricultural market is doing very well. Combine monitors and pull-behind plows have been good for pipe manufacturers.

## **NRCS Update**

Doug Toews spoke about two new Farm Bill conservation programs, the Agricultural Water Enhancement Program (AWEP) and the Cooperative Conservation Partnership Initiative (CCPI), that may be used for drainage water management. There was discussion about the 3-year limitation on support for management of the practice. There is also limited support by NRCS personnel, due to staff shortages.

Pat Willey updated the group on standards:

- 607 Field Ditches was revised.
- 606 Subsurface Drains needs changes to address plowed-in drains.
- 391 Forest Buffers will be on Federal Register shortly.
- The NRCS standard for mole drain has not been applied in the last five years, so may be eliminated or folded into 606.

He also described the High Resolution Climate Extractor, which is PRISM distributed for any latitude/longitude in the US. The data have been processed to have no gaps, and has been checked for completeness. It is an 80 GB database and is ready, but NRCS does not want to host it. It contains precipitation and max/min temperature for 1960-2001, and will soon be extended to 2007.

Mike Sullivan reported that he follows how much drainage water management is planned or installed through NRCS. In 2008 there were almost 4000 acres, mostly in Illinois, which is a major increase over previous years. This may include systems that were planned but not yet implemented.

## **Bioreactors**

Richard Cooke presented an update of bioreactors. He is testing various ratios of contributing area to bioreactor area. He also described one disturbing result, which was that the first bioreactor design raised the methylmercury concentration. This was found to be due to overefficiency of nitrate removal when there was a continually saturated zone below the tiles. Future designs will have the bottom of the bioreactor level with the tile. Dan Jaynes found that the denitrification is going completely to N<sub>2</sub>, not N<sub>2</sub>O, which is good news. He also mentioned that there is a U.S. patent on bioreactors where tile water is collected and treated. His method would not have this issue. Dan Jaynes will send

patent information to Task Force members. Joe Britt discussed issues with farmer adoption that they have found through the Sand County Foundation.

### **Cover Crops**

Eileen Kladvko reported on the Midwest Cover Crops Council, and the work they are doing to promote cover crops. Interest has greatly increased in some areas due to increases in fertilizer prices and cost-share in some states (cover crops). All are welcome to participate. See <http://mccc.msu.edu> for more information. Bill Kuenstler discussed state NRCS standards that can be varied in each state. Joe Britt discussed incentives.

### **----- Thursday -----**

**Indiana:** Jane Frankenberger reported that the CIG project is continuing and will finish this year. They have done the GIS analysis for a CREP wetland project modeled on the successful Iowa program. A drainage field day will be held August 14-15 at the Southeast Purdue Agriculture Center.

**Minnesota:** Craig Schrader presented Minnesota drainage activities. One activity of note was that they used grant money to hold a drainage management workshop for selected contractors (by invitation). All expenses were paid for contractors that had good potential to start implementing the practice. They also have a new field that is 160 acres, drained on the contour, with buried control structures.

**Iowa:** Dan Jaynes discussed the CIG sites, which are generally going well. The high rains in 2008 posed a drainage challenge even for conventionally-drained fields. Bruce Atherton, Agricultural Engineer for NRCS, presented an Interim Conservation Practice Standard for Denitrification Bioreactors. (Code 7xx). It may be early, but very helpful to go through the process. The group discussed issues such as flow criteria.

**North Carolina:** Muhammed Youssef spoke about applications of DRAINMOD-NII and efforts to renew farmer's interest in managing drainage. They have installed some new drainage water management sites.

**Ohio:** Larry Brown said that the Overholt Drainage School had a session on drainage water management for the fourth year. 50% of attendees are from outside Ohio. Norm Fausey described the four regional sites, where they have collected topographic data, EC, and yield data, and are working up how to relate factors to determine the drainage water management effect.

**Louisiana:** Jim Fouss spoke about open-ditch drainage and potential in the Southeast for Drainage Water Management. He also reported the Cabin-Teele sub-watershed project in northeast Louisiana involving ditch drainage management was re-instated by ARS for a 2-year period beginning in FY-2009, and Tim Appleboom continues to work on the project as his ARS Research Associate appointment was extended to 09/30/2010.

## **Agricultural Drainage Management Coalition**

**CIG project:** Leonard Binstock reported that the CIG grant is finishing this year. There will be a workshop at the LICA summer meeting in Des Moines. (Will be limited to 40 people) Information will be available on the web site soon. He described current interest in drainage water management by several investors. He asked everyone to forward information or news releases to Leonard so that they can be put on the ADMC web site.

Charlie Schafer reported on recent activities of ADMC. Some of them are:

- The drainage industry is concerned about getting onto the land in the growing season. Contractors get on the land a few weeks in the spring and a few weeks in the fall. They have talked with new NRCS Chief Dave White about support to producers for setting land aside for installation of practices. There is a provision in EQIP called “income foregone”, which might make this possible. FSA has a provision for seedbed preparation.
- Bioreactors seem to have a lot of interest. ADMC members are happy to provide product to support demonstration.
- ADMC members continue to look at cost-share practices and encourage drainage water management. They see CCPI as a good potential for new cost-share.
- The federal stimulus program’s emphasis on infrastructure may have potential for agricultural infrastructure. The Clean Water State Revolving Fund has been identified as a potential opportunity for infrastructure to improve water quality.
- They continue to be interested in quantifying agronomic and environmental benefits of drainage water management and how to encourage producers to continue to manage the water. Water quality trading is a promising way to provide continued support.
- He recently discussed drainage water management with Sally Collins, USDA Director of Ecosystems and Markets. They discussed drainage water management as a practice that is tradeable for N and possibly P. She will be visiting the Soil Tilth lab together with Carl Lucero next week.
- They are thinking about how to support a watershed-scale drainage water management project. There may be opportunities together with drinking water systems. They look to others for advice and direction.
- The ADMC is thinking about changing names. Suggestions are welcome.

## **Update on EPA Hypoxia Action Plan**

Dan Jaynes updated the group on the Hypoxia Action Plan. Drainage management had not been discussed at the recent meeting, but a webinar is being arranged for members to hear about agricultural drainage and its importance in the Mississippi basin. He also showed the new SPARROW model output, which shows probabilities of being a major contributor for nitrate. The highest areas are mostly in Illinois, Indiana, and Ohio in this new model. None are in Minnesota, and few are in Iowa, which is a change from previous model results. It was released in ES&T yesterday.

Mike Sullivan discussed the 2008 Hypoxia Action Plan. There is a new emphasis on specificity and accountability, and there will be a report each year reporting on progress towards goals. At the coordinating Committee last week, they focused on state-level nutrient reduction strategies, and federal strategy. The next Hypoxia Task Force will be held in Iowa in the Fall.

### **ARS Update**

Mike Shannon, National Program Leader for Water Availability and Watershed Management, described ARS activities and relevant changes resulting from the 2009 Farm Bill. The NP-211 Water Availability and Watershed Management has six areas, of which one is drainage management. There will be a data call for the accomplishment report in May in preparation for the next cycle of the Action Plan next year.

### **DRAINMOD-NII Data sets**

Wayne Skaggs said that DRAINMOD-NII has been tested or is currently being tested in six states, so the knowledge base is growing greatly.

- Indiana: Kladivko et al (Clermont), Ale et al (Drummer)
- Iowa: K Thorpe, D. Jaynes (Kossuth, Ottosen)
- Illinois: David et al (Drummer)
- Minnesota: Lou, Sands (Webster)
- Ohio: Brown and students (TBD)
- North Carolina: Youssef (Portsmouth)
- Sweden: Salazar et al (Loamy sand)

### **Drainage Water Management Online Advisory**

Wayne Skaggs demonstrated a web site being developed to help renew interest in drainage water management. It includes background on drainage water management, general guidelines, frequently asked questions, and an opportunity for site-specific information. They have signed up a dozen producers as cooperators, who will test the site and provide feedback. The site has not been officially released, but people are welcome to preview it at <http://www.bae.ncsu.edu/topic/drainageadvisory>.

### **Modeling to explore potential benefits of various nitrate reduction practices**

Dan Jaynes presented an estimate of potential benefits of drainage water management based on a regional simulation using RZWQM. Over the many sites, the following changes in nitrate flow pathways were estimated: denitrification increased by 40%, plant uptake increased by 2%, tile flow decreased by 51%, deep seepage increased by 14%. (It was not determined whether deep seepage gets denitrified or ends up somewhere else.) Then they looked at how much of the land is suitable, based on drained land less than 0.5% slope (based on soil survey data with considerable interpretation). The conclusion was that about 6% of the land was suitable, and implementation of drainage water management could result in a total of 85 million Kg of N removed. This is about 8% of

reductions targeted for the Upper Mississippi and Ohio basins. Estimated cost of removal is \$2.27/kg N/year, which is less expensive than estimates of other practices. .

Dan Jaynes also discussed a new practice that he called induced interflow through the riparian buffer. It has the potential to remove almost all nitrate that flows through the buffers, but the hydraulic limitation would greatly limit the applicability of the practice. In an entire watershed, the practice could result in about 2% of nitrate loss. This is a small percentage, but solutions to the extra nitrate concern will require many small solutions. Nitrate reduction could be equal to about 10 or 12 CREP wetlands.

### **Open Ditch Drainage Water Management for N Load Reduction**

Jim Fouss discussed the potential and need for open ditch drainage water management. Wayne Skaggs explained that potential reductions are similar to subsurface drains, but the amount depends on drainage intensity. Nitrate loss reductions are reduced by 50%, which is a greater amount at higher drainage intensity.

### **Timing and Location of Next Meeting**

The location of the Fall meeting was discussed, with some suggesting Memphis or other locations in the south to help build connections with open ditch drainage. It was decided that we could go there in spring 2010. Another idea would be to go to either Fargo or Sioux Falls, which are growing areas of interest for drainage.

For the Fall, the emphasis will be on reporting from the CIG project. Reports should be ready, and results could be presented and discussed.

**The location will be Minneapolis.** Leonard Binstock will work with University of Minnesota participants (Gary Sands, Craig Schrader, Jeff Strock) to identify a good location. Tentative weeks are Oct 12-16 or 19-23.

### **Future Topics and Activities**

- It is critical that we learn more about where the nitrate goes. Jeff Strock said that at the Hicks site in Minnesota, measurements are being conducted on green house gas emissions (chamber and tower methods), nitrogen uptake in grain and tissue (corn), soil storage, transport below the tile, and load from the drainage system. These data exist for conventional and controlled drainage systems and undrained crop and prairie systems, which will help address the question. At the Fall ADMS meeting, we could look at the monitoring techniques and results from these studies.
- New geospatial technology, which is being adopted much faster by the private sector, such as designing entire systems using LIDAR. LIDAR will soon be available for the entire state of Ohio, and a guide for using it has been developed. Larry Brown will send it to Task Force members
- Mark Sunohara of Agriculture Canada has almost finished the report from the first four years of their drainage water management project. He will send notice of the report to the ADMS listserver (drainman@ecn.purdue.edu).

- We need to look at the ADMS web site, which is getting dated. It should include resources like access to published papers, powerpoints, etc. Gary Sands and Eileen Kladvko volunteered to join Jane Frankenberger, Jim Fouss, and Mike Sullivan to work on this.
- Gary Sands will provide a bibliography on drainage water management.
- How drainage management relates to global warming
- Incentives for retrofitting

#### **Summary of plans for next meeting**

- Minneapolis, mid-October. Leonard Binstock, Gary Sands, Craig Schrader, Jeff Strock will plan
- Focus will be on (1) summarizing results and lessons learned from the CIG project, and (2) looking forward and future goals.
- CIG collaborators will be given plenty of time to present findings. Since this is the largest CIG, many people are watching, and we need to make sure that we are ready to draw some conclusions and make recommendations. Although research questions remain, we need to be ready to present what has been found so far.

## Attendance

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## Agricultural Drainage Management Systems Task Force Agenda

Columbus, Ohio  
April 01 - 02, 2009

<b>Wednesday, April 01, 2009</b>		
1:00 PM	<ul style="list-style-type: none"> <li>• Call the Meeting to Order &amp; Introduction of Visitors</li> <li>• ARS Midwest Area Director (Office: Peoria, IL)</li> <li>• Welcome to Columbus - NRCS State Conservationist Announcements, Local Arrangements, Overview of Agenda, other Introductions                             <ul style="list-style-type: none"> <li>• <i>Goal: Reach out to others interested in the Task Force and its Mission, specific goals, and areas of activity.</i></li> </ul> </li> </ul>	Norm Fausey Drs. Larry Chandler Terry Cosby, OH NRCS State Conservationist Norm Fausey –Larry Brown Jim Fouss & Mike Sullivan
1:30 PM	Large-Scale Project planning in Iowa on a drainage rehabilitation project together with constructed wetlands (review of CSREES Nat'l. Water Meeting presentation by the Iowa Secretary of Agriculture)	Matt Helmers
2:00 PM	OHIO's Approach to Dealing with Failing Rural Drainage Infrastructure Needs	David Hanselmann, Chief Soil & Water Cons., ODNR
2:20 PM	Drainage Questions in 2012 Census of Agriculture	Dan Jaynes
2:30 PM	Overview of the Impact of the 2009 Economic Recession: <ul style="list-style-type: none"> <li>• on State Ag Exp Stations &amp; Land Grant Universities</li> <li>• on Drainage Industry - Agriculture &amp; Construction</li> </ul>	Steve Slack, Dir. OARDC Kevin Rapp, ADS
3:00 PM	<ul style="list-style-type: none"> <li>• ADMS &amp; Economic Overview from National and Ohio Land Improvement Contractors</li> </ul>	Louis McFarland, President, OHIO LICA
3:30 PM	15 min. BREAK	Coffee, etc.
3:45 PM	Update from NRCS on Drainage Water Management implementation opportunities through EQIP Activity Plans, AWEP, and CCPI.	Doug Toews, Mike Sullivan Pat Willey, et al.
4:15 PM	Updates on Bioreactors and Cover Crops ( w.r.t. DWM) <ul style="list-style-type: none"> <li>• Bioreactors: research status, demonstration, Prac. Stds.</li> <li>• Cover Crops: research, demonstration, practice standard</li> </ul>	Richard Cook, Dan Jaynes, Joe Britt, and Doug Towes Eileen Kladviko & J. Britt
5:00 PM	Announcements re: Evening Sessions (if any planned) and Announcements for Tomorrow's program	N. Fausey; M. Sullivan, L. Brown, or J. Fouss
5:10 PM	Wrap-Up Announcements & <b>Adjourn</b> by 5:15 PM	J.Fouss, N.Fausey, L.Brown

<b>Thursday, April 02, 2009</b>		
8:00 AM	- Introduction of additional members who are attending - Any New Announcements for the Day's Agenda	Mike Sullivan Norm Fausey – Jim Fouss
8:10 AM	Summary of State Reports on ADMS activities: <ul style="list-style-type: none"> <li>● Ohio</li> <li>● Iowa</li> <li>● Minnesota</li> <li>● Illinois</li> <li>● Indiana</li> <li>● North Carolina</li> <li>● Louisiana</li> <li>● Others present (e.g. MO, MI, ?)</li> </ul>	Norm Fausey, Moderator: Updates (10 min. max each) Presentations from States' CIG Project Managers.
9:15 PM	Overview/Update by <b>Drainage Management Coalition</b> : - CIG Project; DWM Field Demonstrations; Future Plans for related activities / programs, e.g., Nutrient Trading.	Charlie Schafer and Leonard Binstock
9:45AM	Update on EPA Hypoxia Action Plan & Oct. '08 Webcast Update on States & Federal Nutrient Mgmt. Strategies	Dan Jaynes Mike Sullivan
10:15AM	15 min. BREAK	Coffee, etc.
10:30AM	ARS Update - Activities & Plans by NPL, Beltsville, MD	Mike Shannon
10:45AM	Update on input data sets for soils, weather, and cropping for DRAINMOD in ADMS-TF Midwest focus States	Mohamed Youssef, Wayne Skaggs & Cooperators
11:05AM	Update of Upper MS River Basin Modeling & Simulation re: nutrient loss from Upper Basin cropland that flows down the MS Rv to the Gulf, and potential benefits of riparian buffers, and tile water distribution systems.	Dan Jaynes
11:40AM	Break for LUNCH-- On Your Own -	Instructions: Fausey; Brown
1:00 PM	Open-Ditch Drainage Water Management for N-load reduction: Need for field testing & demonstrations	Wayne Skaggs, Jim Fouss, Mike Sullivan
1:30 PM	Thoughts for <b>Timing &amp; Location of Next TF meeting</b> , and Main Theme or Topics to be covered; e.g.: <ul style="list-style-type: none"> <li>● Activities to Implement Retrofits for Existing Drainage</li> <li>● Future Goals – Mission for the ADMS Task Force</li> <li>● Partners with other Groups, Committees, Task Forces</li> <li>● Number of meetings/year? Web Conference in 2010?</li> </ul>	<u>Moderators</u> : Jim Fouss, Mike Sullivan, Jane Frankenberger, Norm Fausey, Leonard Binstock et al.
2:30 PM	Open Discussion – any topic, e.g.: Satellite or Aircraft surveillance images re: DWM? DWM Retrofit Incentive?	Jim Fouss, Norm Fausey <b>Task Force membership</b>
4:15 PM	<b>ADJOURN</b> the meeting @ 4:30 PM or somewhat before	Jim Fouss & Norm Fausey