

# Three-Year Data Package Shows Promise For Drainage Water Management

By Steve Werblow

**A**gricultural drainage water management reduced nitrate outflows by an average of 30 to 60 percent, according to a report by the Agricultural Drainage Management Coalition (ADMC). The report included data collected in five Midwestern states over a three-year period, the culmination of a demonstration program coordinated by ADMC and funded by a Conservation Innovation Grant (CIG) from the U.S. Department of Agriculture Natural Resources Conservation Service.

Despite weather and logistical challenges during the 2007-2009 study period, which made it difficult to ascertain the yield impacts of controlling drainage in farm fields, the data illustrates the promise of drainage water management for millions of acres of Midwestern cropland, says Leonard Binstock, executive director of ADMC in Owatonna, Minn.

“The environmental impact has been getting a lot of attention in the field, among environmental conservation groups, and all the way up the line in Washington, DC,” Binstock says. “And though the protocol for the CIG program doesn’t allow us to scientifically assess yield benefits, many farmers who have been working with these systems believe drainage water management has already helped them maintain or increase yields by being able to hold up the water table during dry summers.”

With increasing scrutiny of fertilizer use in the Midwest and its impact on the Gulf of Mexico’s hypoxic zone, or oxygen-starved “dead zone,” Binstock predicts that interest in minimizing those off-site nutrient flows is sure to rise.

## Removable Stop Logs

Drainage Water Management systems employ control structures along the mains at specific elevations in the field to control the level of the water table. Growers can quickly add or remove small weirs, or stop logs, to adjust the depth of the subsurface moisture.

Adding stop logs after harvest helps store water from fall and winter rains, reducing outflows that can contribute to flooding. Those outflows also carry a load of dissolved nutrients – keeping them in the field reduces the nutrient load carried by drainage ditches and rivers. During planting and harvest, growers can dry out the soil profile to accommodate



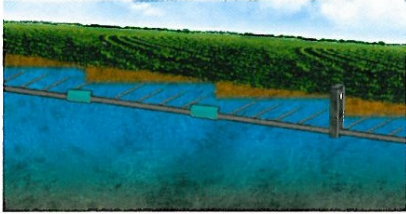
Installing remotely controlled in-ground control structures could make drainage water management feasible on millions more acres of farmland.

fieldwork and replace stop logs to capture spring rains.

“Controlling drainage water is important not only in the spring when we’re wet – we can pull our gates and drain the fields to get equipment in – but also when we’re droughty through the middle and last part of the summer,” notes drainage contractor Chuck Wingert, owner of Wingert Realty and Land Services in Mankato, Minn., who designs controlled drainage systems.

“The geneticists say they have 300 to 350 bushels of yield potential in corn,” Wingert adds. “We have the best soils, the





Conventional control structures (right) may now be augmented by buried WaterGate control devices, allowing contractors to design drainage water management systems for fields with slopes of 1.0% or even more.

best chemicals and the best genetics. Now the question is whether we can almost double our yield with the same amount of rainfall we've had before. As our yields move up, we're going to need to conserve the moisture we get to accomplish those yields."

### New Way of Thinking

Designing systems to manage drainage water requires a more thorough

approach to planning and layout, says Wingert.

"We're re-thinking how we've always thought in the past," he explains. "In the past, it was 'just put in the main and run your strings up the hill.' Now we need to think about how we can take out what we need for farmability and keep the rest in the soil to support the crop. We need to look at the topography and the soils and the layout."

Mike Tveten, survey manager for Ellingson Drainage in West Concord, Minn., says the drainage water management projects he has designed over the past few years have taught him to think in terms of how to manage water depth with minimally graded tile rather than using a more significant grade to drain water off quickly.

"As drainage contractors, we like to put grade on our lines, obviously, but it's a different ballgame when you're

The WaterGate control structure by Agri-Drain may be buried and operated remotely so producers may farm over the structures.



trying to control drainage," Tveten says. "You don't want a lot of grade on your tile. You want to be more on the contour. It's a challenge."

Learning the new approach takes commitment up front, says Tveten, and now is the time for progressive drainage contractors to get up to speed.

"It is our commitment at Ellingson Drainage to be at the forefront of any new technology," he explains. "We

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## Three Year Data Package Shows Promise for Drainage Water Management

Cropping and yield data for Site 4 -Indiana		2005	2006	2007	2008	2009					
<b>Crop</b>	<b>20 in rows</b>	<b>Corn</b>	<b>Corn</b>	<b>Corn</b>	<b>Corn</b>	<b>Corn</b>					
<b>Planting Date</b>		4/20/05	4/22/06	4/20/07	4/30/08	4/25/09					
<b>Tillage</b>	<b>Conventional</b>	Fall – disk ripper	Fall – disk ripper	Fall – disk ripper	Fall – disk ripper	Fall – disk ripper					
<b>Fall N application</b>	<b>Actual N#/acre</b>	78	29	30	Variable*	170					
<b>Pre-plant N application</b>	<b>Actual N#/acre</b>	160	170	160	170	11					
<b>Phosphorus</b>	<b>Actual P#/acre</b>	88	30	37	Variable*	5 or 55					
<b>Potash</b>	<b>Actual K#/acre</b>	Yes	81	83	Variable*	0 or 100					
<b>Harvest date</b>		10/12-13/05	10/4/06	9/21/07	10/4/08	10/5/09					
<b>MD=Managed Drainage CD=Conventional drainage</b>		<b>CD</b>	<b>MD</b>	<b>CD</b>	<b>MD</b>	<b>CD</b>	<b>MD</b>				
<b>Yield (dry)</b>		176	175	215	211	241	236	136	132	220	208

Year	Growing Season Flow (in)			Growing Season Nitrate Loss (lbs/acre)		
	Managed	Conventional	% Difference	Managed	Conventional	% Difference
2007	2.0	1.4	-36	4.08	2.50	-48
2008	6.4	4.9	-27	19.44	18.50	-5
2009	6.9	5.7	-20	10.76	8.90	-19

Note: The growing season was designated as May 1 through August 31.

Significant differences in outflow and nitrate loss were observed in most of the 20 sites in the three-year drainage water management demonstration project coordinated by the Agricultural Drainage Management Coalition; several, like this site near Crawfordsville, Ind., also saw yield benefits from the practice.

want to give our customers every opportunity to make this work.”

In fact, it’s important that any contractor interested in drainage water management learn how to design systems properly right from the start, Tveten points out. Successful drainage water management systems can create a new market for drainage contractors, but on the other hand, stories of poorly designed systems could discourage farmers from considering the technology.

### LICA and ADMC: Resources

“Obviously, with any new technology and practice, there is a learning curve,” says Tveten. “You need to talk with people who have been working with this for a while.”

Wingert agrees, and points out that LICA is a great place to start. “The LICA people tend to be some of the most technologically advanced and current people in the industry,” says the 34-year LICA veteran. “They tend to

be the ones who are making this happen – they are at the forefront of any new knowledge, new technology, and new ways of doing things that improve efficiency.

“Get familiar with ADMC, their research and their designs,” Wingert adds. “They’re helping you stay in the forefront of this technology.”

Binstock encourages contractors to contact ADMC at (507) 451-0073 or at [jhsansen@admccoalition.com](mailto:jhsansen@admccoalition.com) to sign up for training seminars on designing controlled drainage systems, some of which could lead to qualification under USDA NRCS’s technical service provider (TSP) rules. He notes that at the request of National LICA, ADMC is now offering membership at half the usual dues rate – \$250 instead of \$500 – to LICA members whose state associations are members of the Coalition.

“Membership in ADMC as well as LICA helps keep contractors up to date on the latest in drainage water technology



Leonard Binstock of the Agricultural Drainage Management Coalition (ADMC), left, discusses the design of a field-scale demonstration plot with grower Dirk Fleck (center) and Purdue University’s Nathan Utt (right)

and practice, and it helps support the effort to promote drainage water management at all levels, from the field to the U.S. Capitol,” Binstock says.

ADMC also maintains a significant online resource, he adds. The CIG report, as well as flow data from the 20 sites in the project, articles and bulletins about drainage water management, and contact information for experts in the field is available online at [www.admccoalition.com](http://www.admccoalition.com). ▼