



Ecosystem Services:
Bringing Drainage Water
Management to Market

Toxin leaves 500,000 in northwest Ohio without drinking water

BY GEORGE TANBER

TOLEDO Ohio | Sat Aug 2, 2014 7:35pm EDT

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Excerpt from Testimony of
James J. Pletl, Ph.D.
Director of Water Quality
Hampton Roads Sanitation District
Virginia Beach, VA

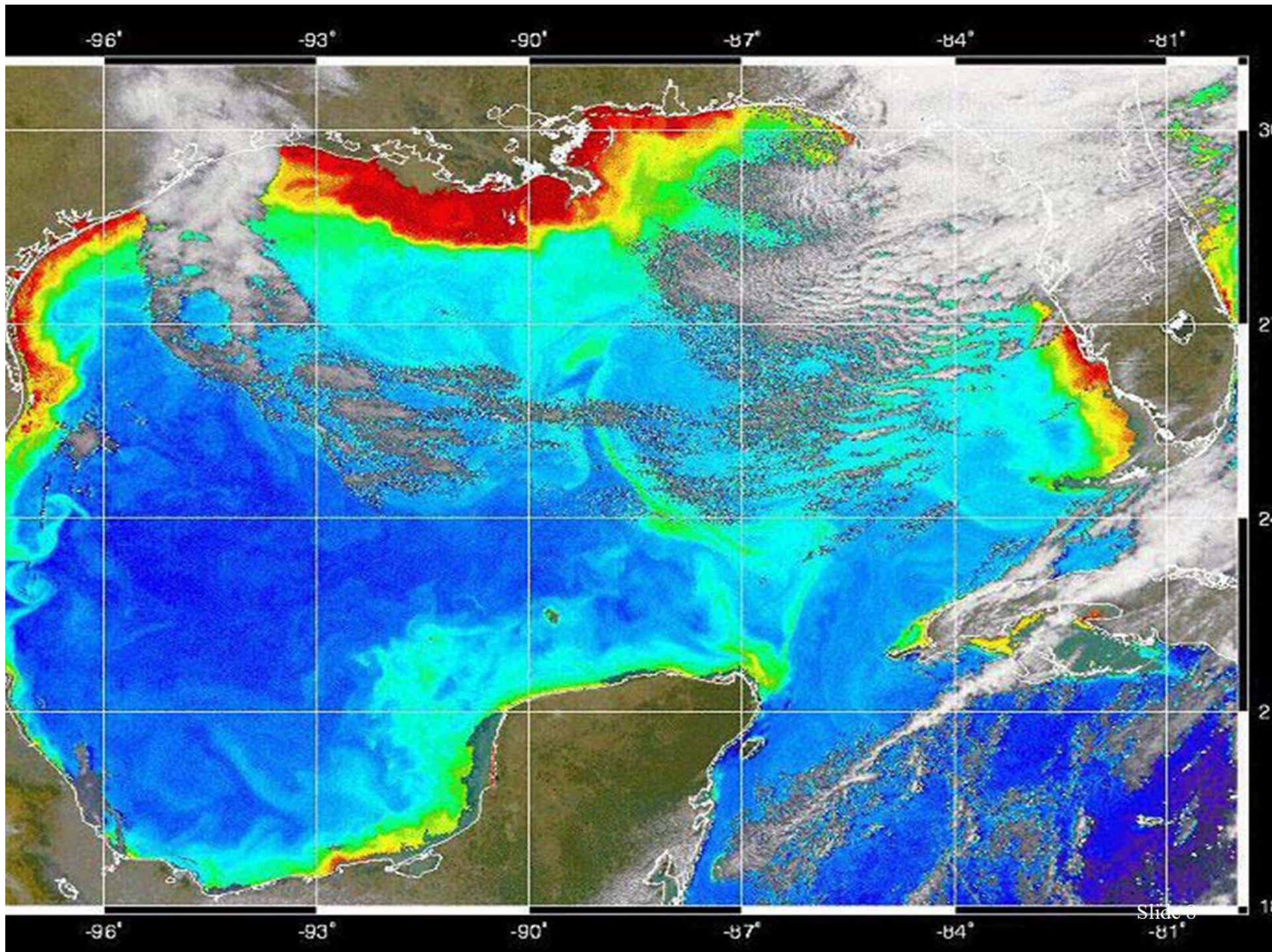
Before House Subcommittee on Water
Resources and the Environment
March 25, 2014

- Since passage of the CWA in 1972, the estimated investment in the Nation's wastewater infrastructure totals \$1.4 trillion
- ... data over the past several years suggest that we may have hit a plateau in terms of water quality gains and that the gains made to date may be at risk absent additional investment.
- ...EPA estimates repairing, replacing, and upgrading aging wastewater infrastructure will cost between \$300 billion to \$1 trillion over the next 20 years.

- Municipalities currently shoulder approximately 97% of the cost of clean water infrastructure projects, and face an immediate backlog of over \$40 billion.
- Clean water utilities have raised rates by more than double the rate of inflation over the last decade to meet their current clean water challenges and existing debt obligations.
- Today 40% of households across America are already paying more out of their disposable incomes for wastewater management than EPA says is affordable.













NY Times: September 22, 1910

PAYING \$307,000,000 FOR IOWA DRAINAGE

**Private Owners of Farms to
Spend All But \$60,000,000
of the Sum.**

TO RECLAIM SWAMP LANDS

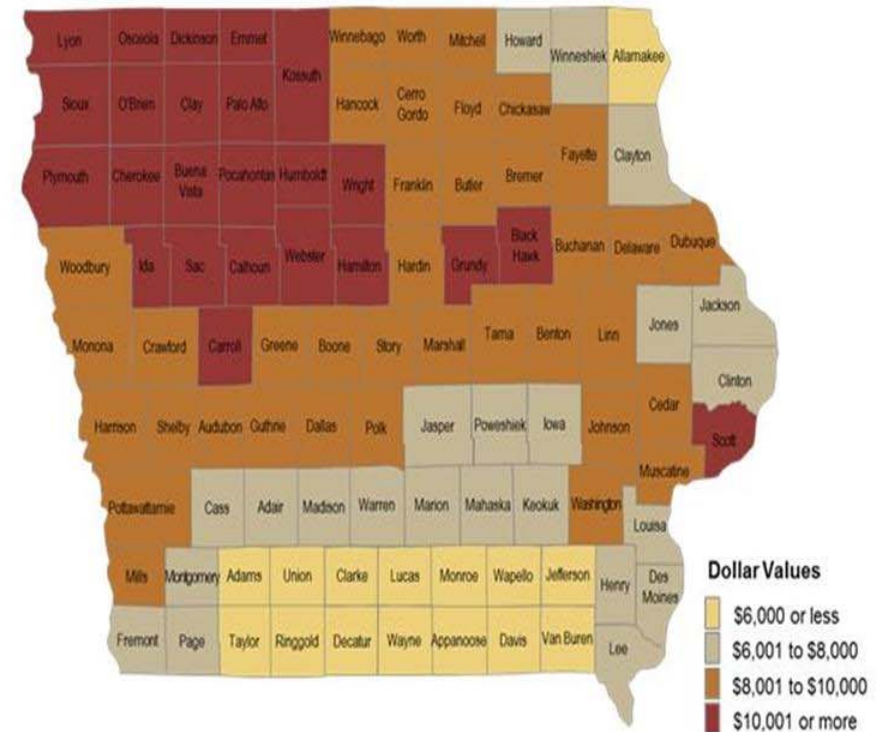
**Values Will Be Increased Millions of
Dollars, Making the State One of
the Richest for Agriculture.**

BURLINGTON, Iowa, Sept. 22.—So quietly that the fact has not become known widely, Iowa farmers have been arranging for drainage improvements in their low lands at a cost that will come within \$85,000,000 of equaling the expense of building the Panama Canal. The general public has little conception of the extent of the enterprise which will increase the value of Iowa lands by millions of dollars.

The total expenditures now planned in Iowa in these improvements is figured at \$307,000,000. This service will result in reclaiming thousands of acres of the most valuable land in the world, and carry out in good measure the policy urged by James J. Hill of making every use possible of the swamp lands of the West. Much of the work has been started already in the various river counties in the State, and some of it has been finished. When completed Iowa will be among the richest agricultural States in the world.

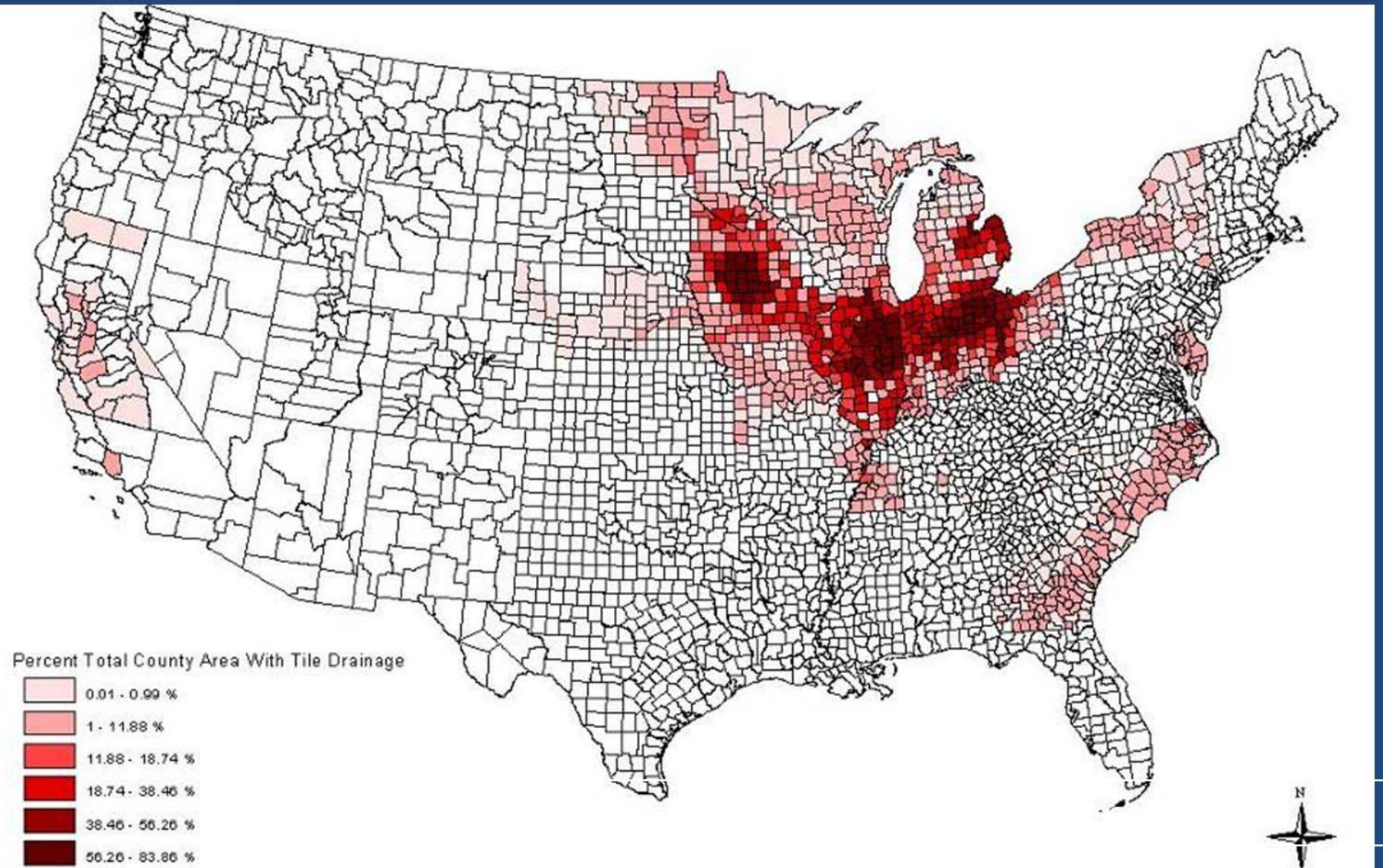
- In 2008, the 92,600 farms in Iowa produced 19% of the nation's corn, 17% of the soybeans, 30% of the hogs, and 14% of the eggs.
- Equity value of Iowa's 30 million acre agricultural land base is around \$250 Billion.
- Annual value of production of corn, soybeans, hogs, cattle, eggs and dairy is around \$32 Billion (2012 Iowa Agriculture Quick Facts).

2012 AVERAGE VALUES



IOWA STATE UNIVERSITY
Extension and Outreach
Healthy People. Environments. Economies.

Estimated percent of land with subsurface drainage



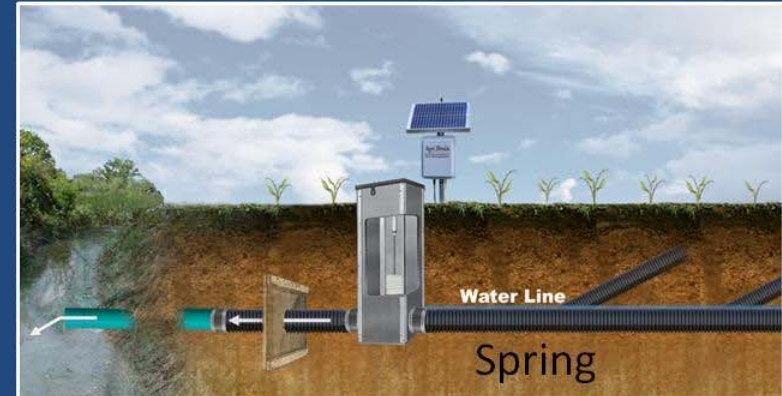
How Water Moves Off Ag Lands



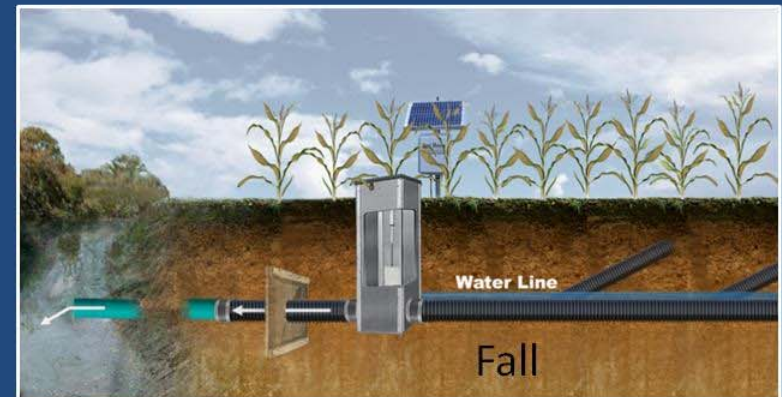
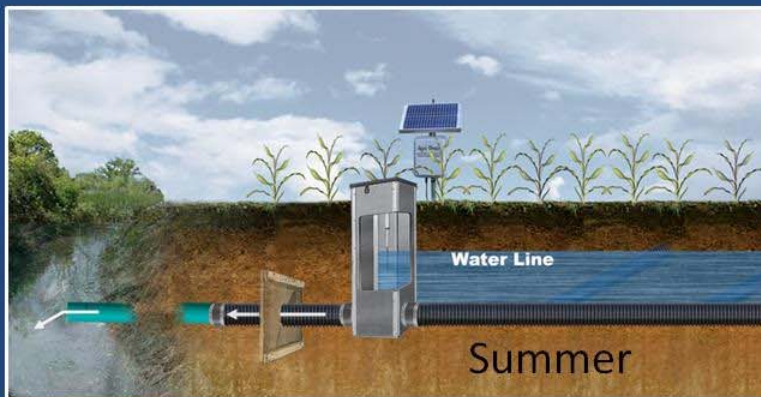
Drainage Water Management



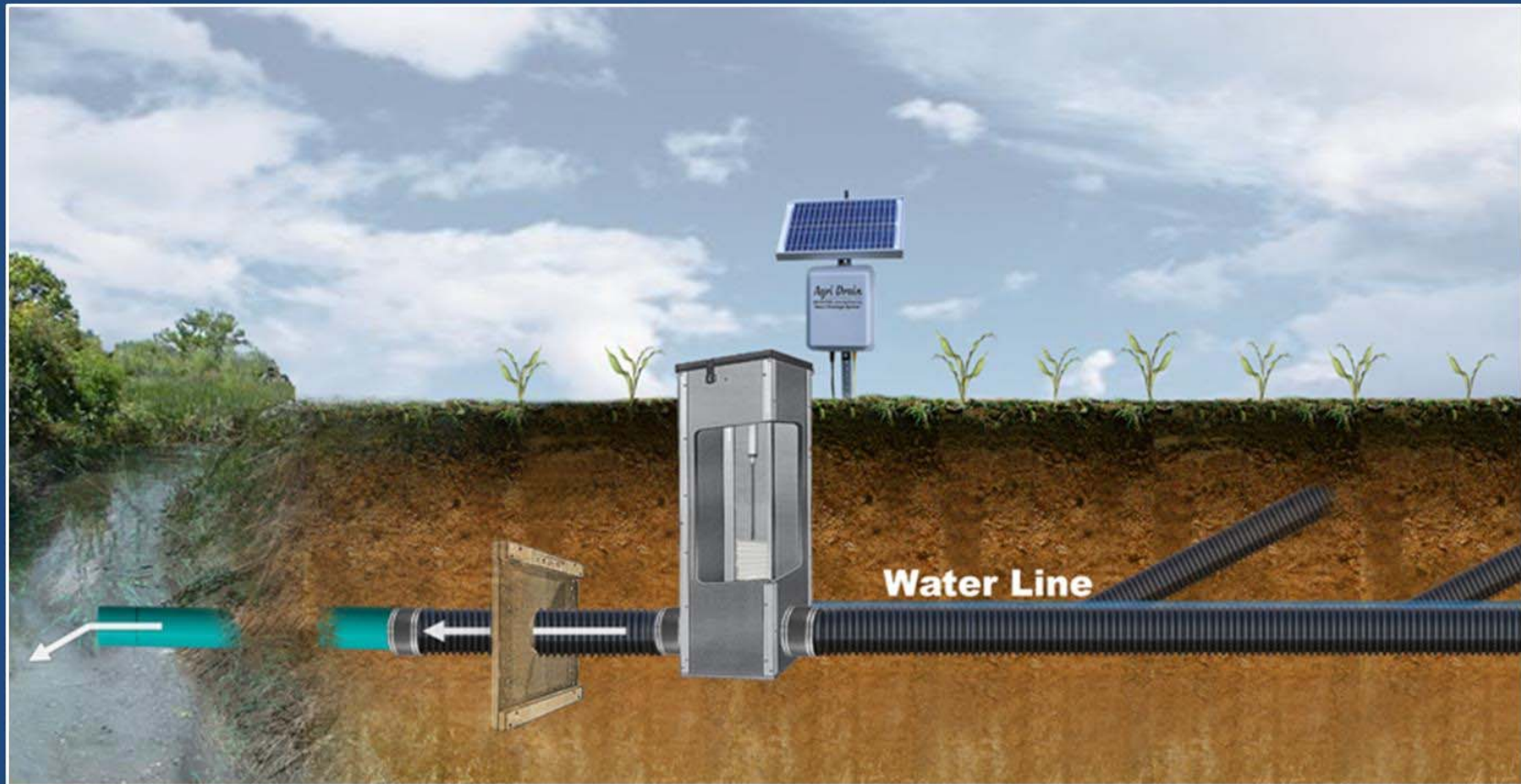
DWM Seasonal Schedule



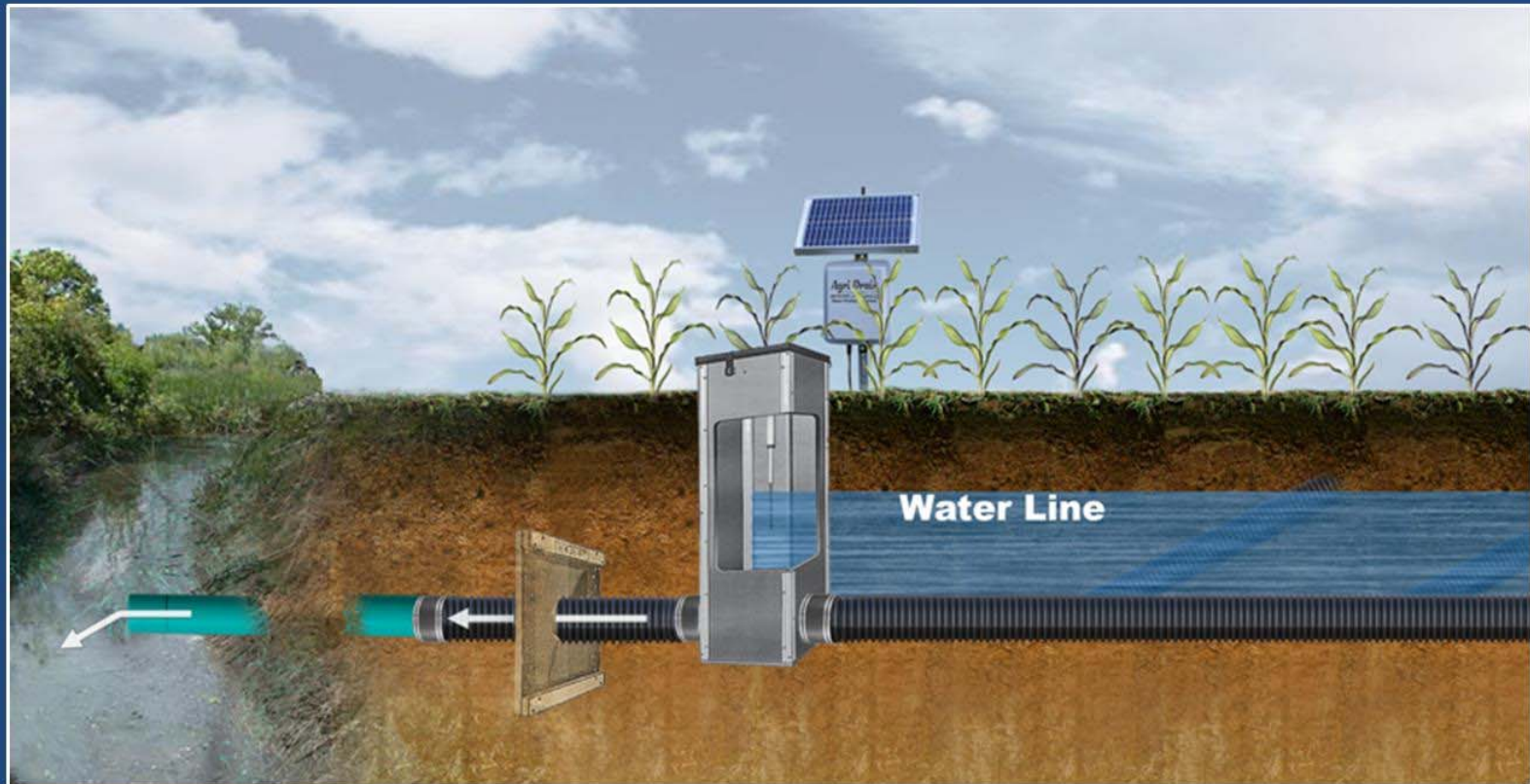
Seasonal Schedule



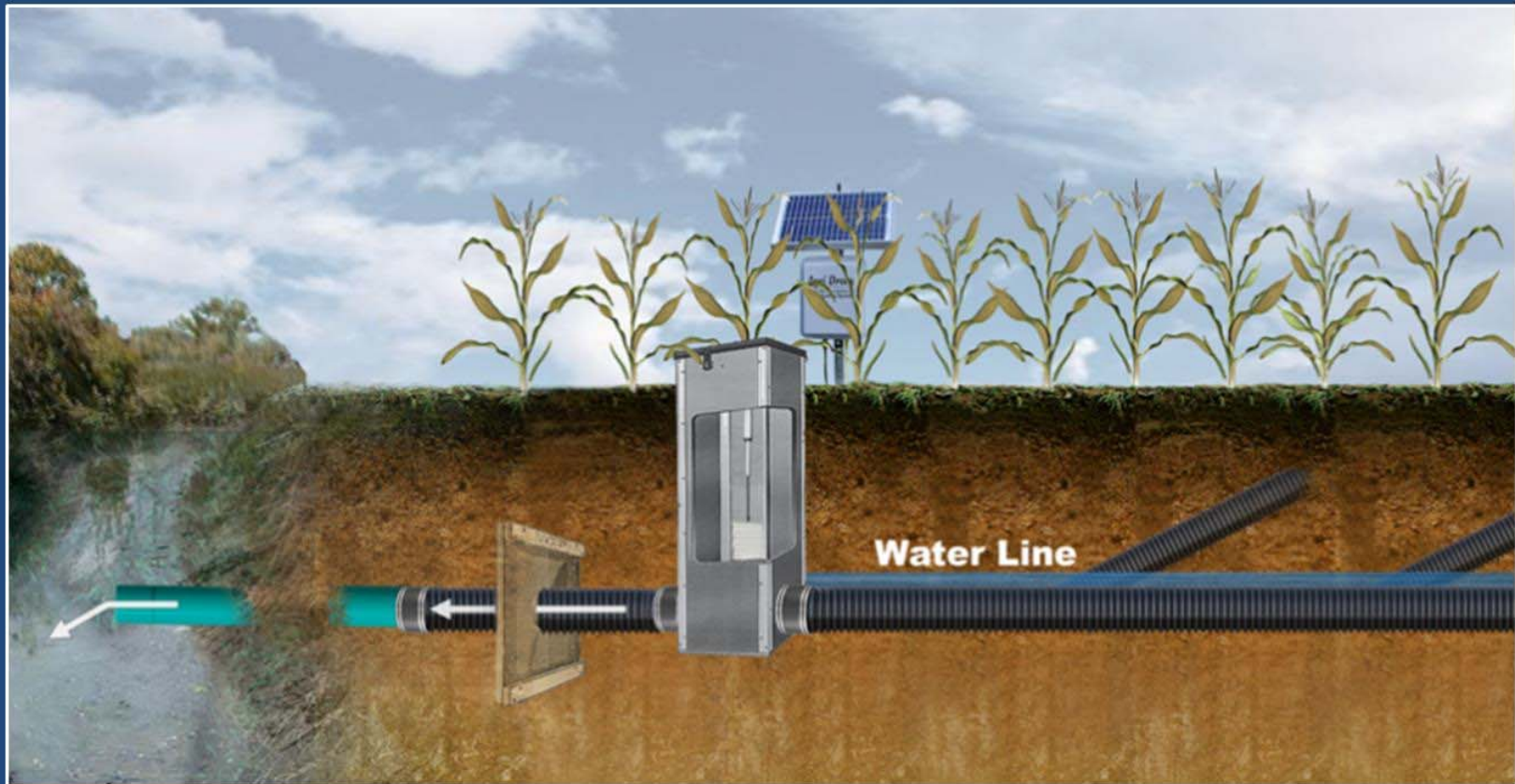
Spring: open gates to let field dry for planting



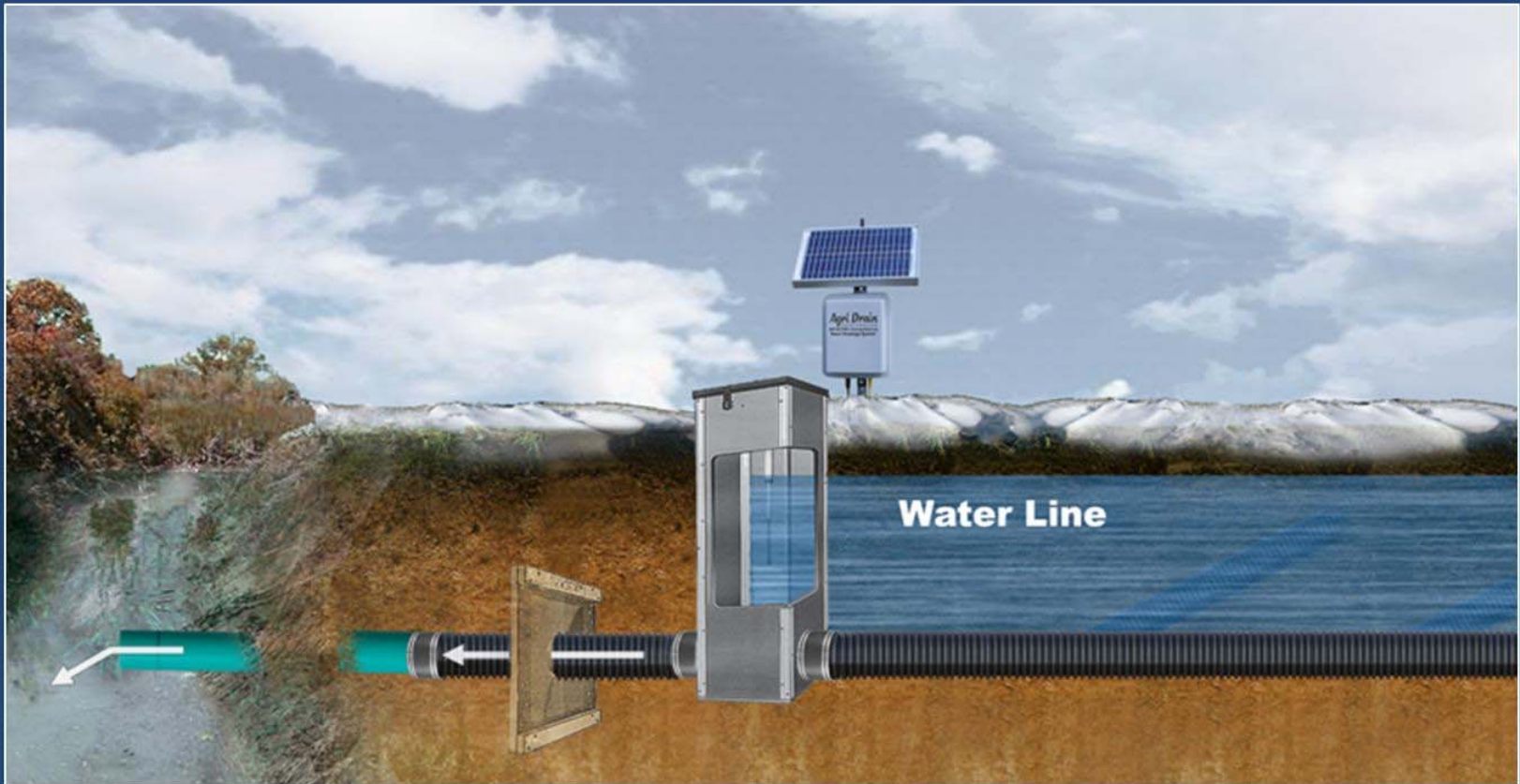
Summer: close and open gates to manage water in field to maximize crop production



Fall: open gates to dry out field for harvest



Winter: close gates to keep water in field



Saturated Buffers





Photo courtesy Dan Jaynes, USDA-ARS)

Bioreactor





Excerpt from Testimony of
George S. Hawkins, ESQ
General Manager
District of Columbia Water
and Sewer Authority

Committee on Environment
and Public Works
United States Senate
May 22, 2012

- The nutrients of concern at Blue Plains are nitrogen and phosphorous.
- Blue Plains was the first jurisdiction to meet the voluntary nitrogen reduction goal laid out in the Chesapeake Bay Agreement in 2000.
- This first action reduced nutrient levels by 40% of 1985 levels, from 14.0 mg/L to 7.5 mg/L at a relatively inexpensive cost of \$16 million.

- The next phase of reductions ended in 2010 and nitrogen concentrations were reduced from 7.5 mg/L to 5 mg/L. This second phase reduction cost approximately \$130 million, which is about eight times the cost of the original, larger reduction.
- In 2010, our NPDES permit was made more stringent to meet a lower limit by 2015. Now Blue Plains is required to reduce nutrients from 5 mg/L to 4 mg/L.
- This incremental reduction is estimated to cost \$1 billion.

- The billion dollar Enhanced Nitrogen Removal project is now under construction and will provide a reduction of one milligram per liter, which is one tenth of the improvements made to date.
- The capital cost of infrastructure to remove one pound of nitrogen has increased about 380 times, and in the last iteration of our permit, we achieve one-sixth the nutrient reduction for 60 times the unit cost of the first incremental reduction.

Drainage Water Management, Bioreactors & Saturated Buffers

- Quantifiable
- Reliable
- Durable

- Improve Water Quality
- Reduce costs to Taxpayers

