One Water Iowa

Roger Wolf
ISA Environmental Programs and Services Director
Understanding Challenges – Upstream
Understanding Challenges – Downstream

Cedar Rapids June 13, 2008

DMWW Nitrate Removal System
Sources of nitrate yields in the Mississippi River Basin

David, et al., 2010. JEQ 39:1657-67
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.

BURLEINGTON, 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.

Excavating a large ditch using steam power, circa 1910.

Hand digging tile, Boone Co., IA, ca 1914

Source: ‘An Iowa album: a photographic history, 1860-1920’ by M. J. Bennet, University of Iowa Press, Iowa City, Iowa
Understanding - Variability of Rainfall Events

Flooding along the Raccoon River, Central Iowa – Summer 2015
Understanding Scope and Scale
1 acre-foot is approximately equal to 1 foot deep of water covering 90 yards of a football field
**Understanding Scope and Scale**

**Visualization:**
Des Moines Water Works source water supply and treatment capacity 100 million gal/day

<table>
<thead>
<tr>
<th>DMWW Fleur Drive WTP Capacity (13 acre-feet/hour)</th>
<th>Mean Discharge of the Raccoon River at 63rd St (198 acre-feet/hour)</th>
<th>Mean Discharge of the Des Moines River at 2nd St (329 acre-feet/hour)</th>
</tr>
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<tbody>
<tr>
<td>Each rectangle represents 1 acre-foot of water</td>
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A One Water Iowa Vision
ISA Strategic Plan

Objective 1: Continuously improve soybean productivity
Objective 2: Continuously improve natural resource management practices and environmental quality
Objective 3: Continuously improve efficiency and profitability of environmentally sound cropping systems
Farmer Engagement + Data

ISA Research Projects 2002 – 2014

- > $40 Million
- Leverage ~ 30% Soybean Checkoff
Measuring – Monitoring – Mapping - Managing

Yield Monitors

Stalk Nitrate Sampling

Replicated Strip Trials

ISA Accredited Lab

GIS

Automated Water Sampler
EPS Highlights - Water Monitoring - Process

**Individual Water Quality Monitoring Report**

<table>
<thead>
<tr>
<th>Date</th>
<th>Nitrate (mg/L NaNO₃)</th>
<th>Ortho-Phosphate (mg/L PO₄)</th>
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<tr>
<td>6/6/2014</td>
<td>6.6</td>
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</table>

The maximum detection limit for nitrate is 10.0 mg/L and 5.0 mg/L for ortho phosphate.
Rock Creek Watershed Goals

• Reduce N loads by 41%
• Reduce P loads by 29%
• Increase Soil Organic Matter by 1%
• Reduce flood risk
• Maintain or increase productivity and profit
• Maintain or increase upland wildlife habitat
• Maintain or increase aquatic life

Timeframe 2013-2038

Investment needed:
$5.5 million for infrastructure investment
$1.4 million per year management practice investment
Partnerships are Key

Public & Private
Urban & Ag
NGO & Ag
Edge-of-Field Practices

Bioreactor

Rock Creek

Cedar Rapids

Gulf of Mexico
**Edge-of-Field Practices**

**Saturated buffer**

- Distribution pipe
- Field
- Water control structure
- Overflow discharge pipe
- Stream or ditch

Not to scale.

Christianson et al. (in press)
Edge-of-Field Practices

Wetland
In-Field Practices

No-till Soybeans

- Cedar Rapids
- Rock Creek
- Gulf of Mexico
Strip-till corn
In-Field Practices

Planting into green cover crop

Map showing locations of Rock Creek, Cedar Rapids, and the Gulf of Mexico.
One Water = integrated, multi-objective water management for creating a sustainable water future