

Protecting Surface Waters in Agricultural Watersheds

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CEO & General Manager
Des Moines, Iowa

Des Moines
Water Works
Water You Can Trust for Life

Water in the News

AP Associated Press

March 10, 2015

**Des Moines water
supplier to sue
counties over
nitrates**

Signs of Water Quality Endangerment

In Iowa:

- “Impaired waters” – limited human contact
- Beach closures – bacterial risk
- High nitrate concentration – record denitrification (148 days in 2015)

Nationally:

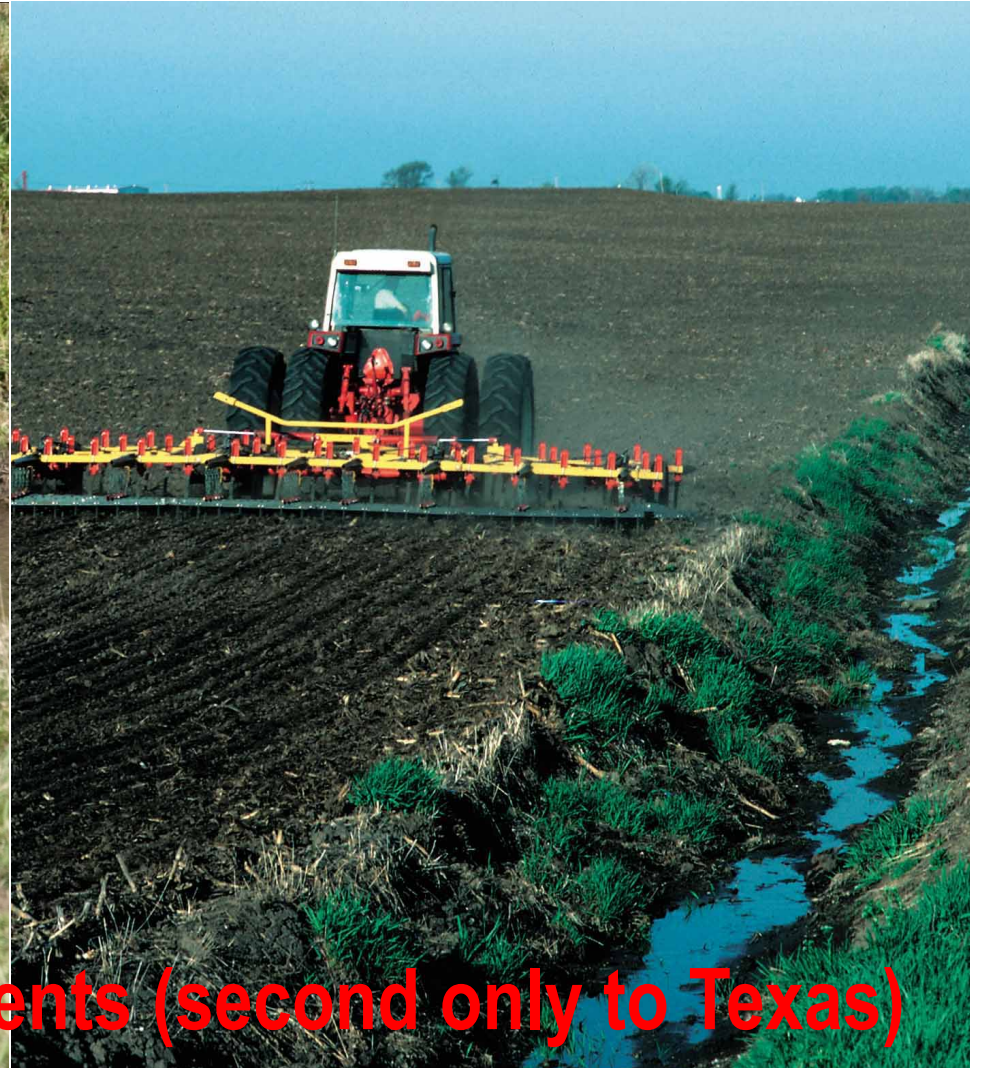
- Hypoxic Zone growth

Agriculture Myth: The Family Farm that “Feeds the World”



Approximately 90,000 Iowa farms
Nearly 90% of Iowa's food is imported

Industrial Agriculture Reality: Highly Capital Intensive, Federally Subsidized Business



\$1.3 Billion in USDA Payments (second only to Texas)

Iowa has produced the largest corn crop of any state for almost two decades . . . three times as much as countries like Mexico



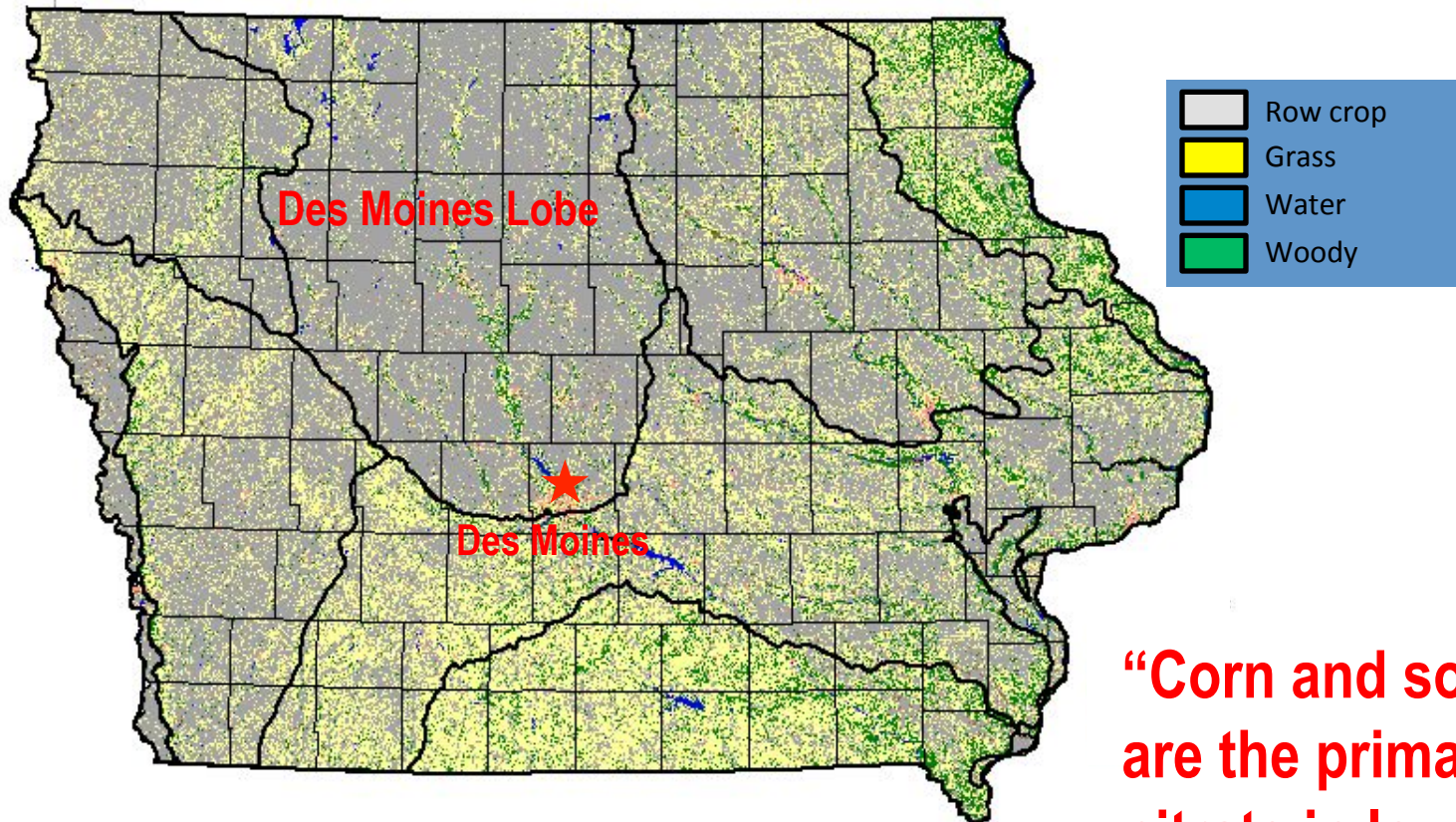
13,100,000 acres of corn and 9,770,000 acres of soybeans were harvested in Iowa in 2014.

Intensive row cropping comes at a price.

Des Moines Lobe: Raccoon River & Des Moines River Watersheds



The Major Driver of Surface Water Quality in Iowa



**Approximately 10,000
square miles upstream**

**“Corn and soybean fields
are the primary cause of
nitrate in Iowa waterways.”**

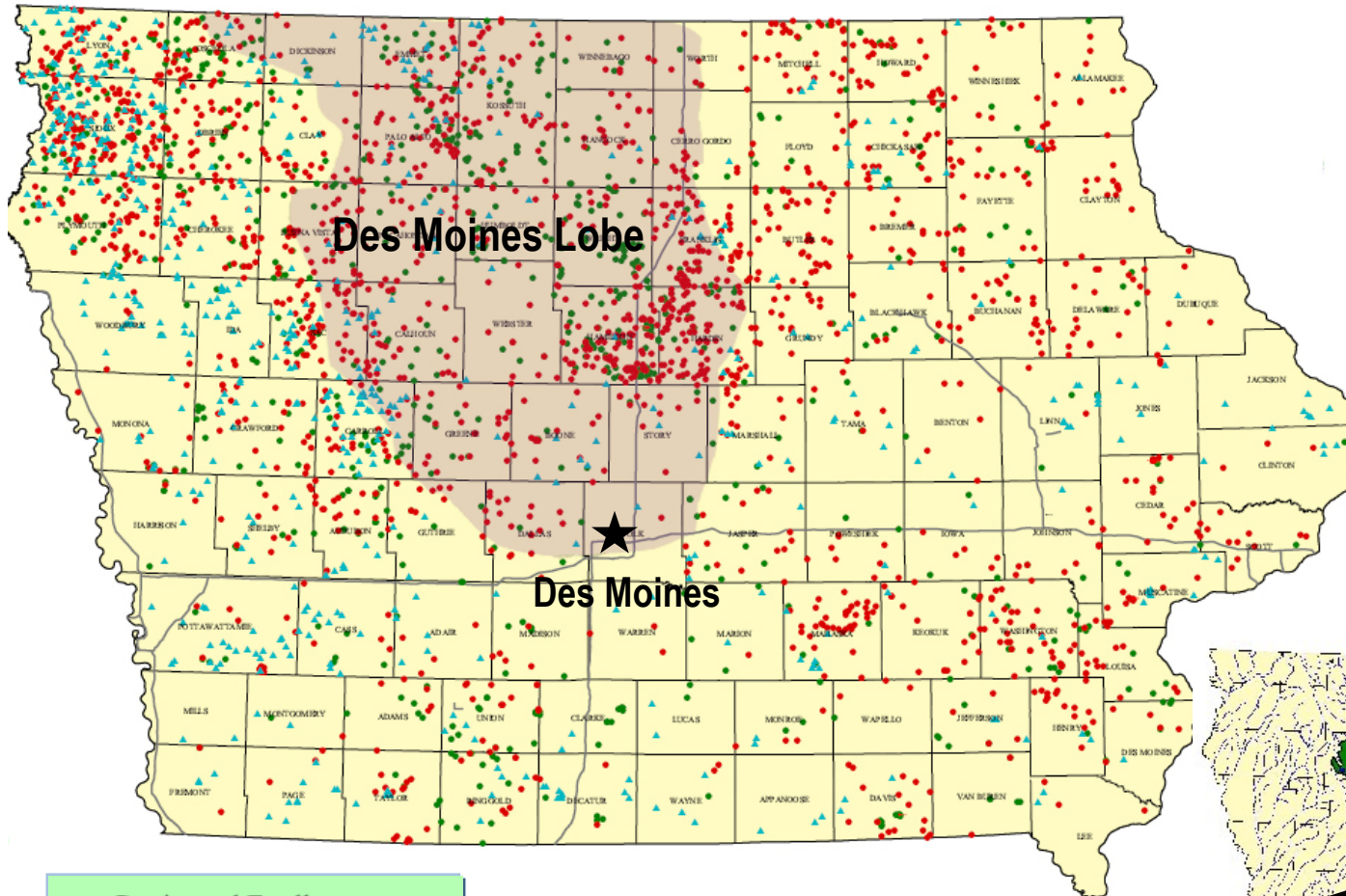
*- Michael Castellano and Matthew Helmers,
Iowa State University*

The Des Moines Register, April 12, 2015

The Major Driver of Surface Water Quality in Iowa

“In 1950, the total number of farm animals in the U.S. was nearly 100 million; by 2007, that number was roughly 9.5 billion, an increase of 9,400%. Meanwhile, the number of farmers fell by 60%.”

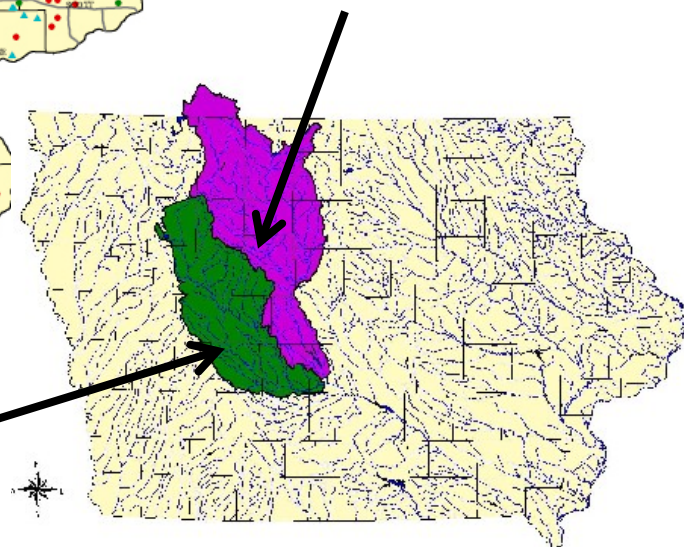
- Barron's, July 27, 2015



- ▲ Registered Feedlots
- Non-Permitted Confinements
- Permitted Confinements

Des Moines River Watershed

Raccoon River Watershed



Top Pollutant Concerns in Source Water

- **Nutrients:** nitrates, phosphorus, ammonia
- Microbial Contaminants: bacteria, protozoa, and viruses
- Spills
- Total Organic Carbon
- Trichloroethylene (TCE)
- Total Trihalomethanes (TTHM)
- Atrazine and Glyphosate (Roundup®)
- Emerging Contaminants: pharmaceuticals and personal care products, and hexavalent chromium

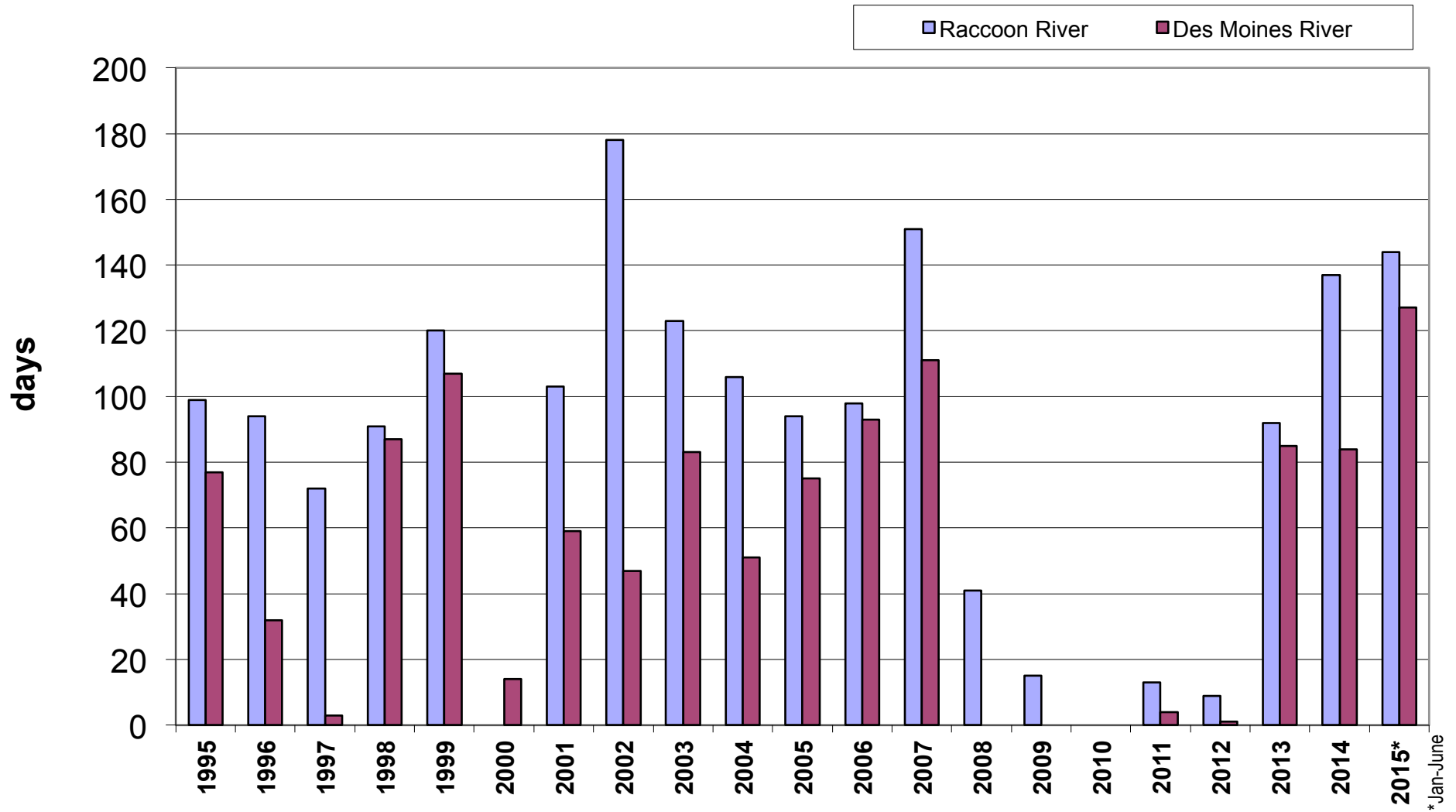


Nitrates (NO₃) in Water

- EPA Safe Drinking Water Standard: **10 mg/L**.
- Nitrate levels above the standard are a **public health** risk. Particularly at risk are infants below six months of age who, if left untreated, could become seriously ill or die.
- Nitrate treatment not addressed through traditional lime softening/filtration system. Side-stream treatment is required.



Number of Days Above the 10 mg/L Nitrate Safe Drinking Water Standard



**Drainage Tiling:
Increasing Water
Quantity while
Reducing Water
Quality**

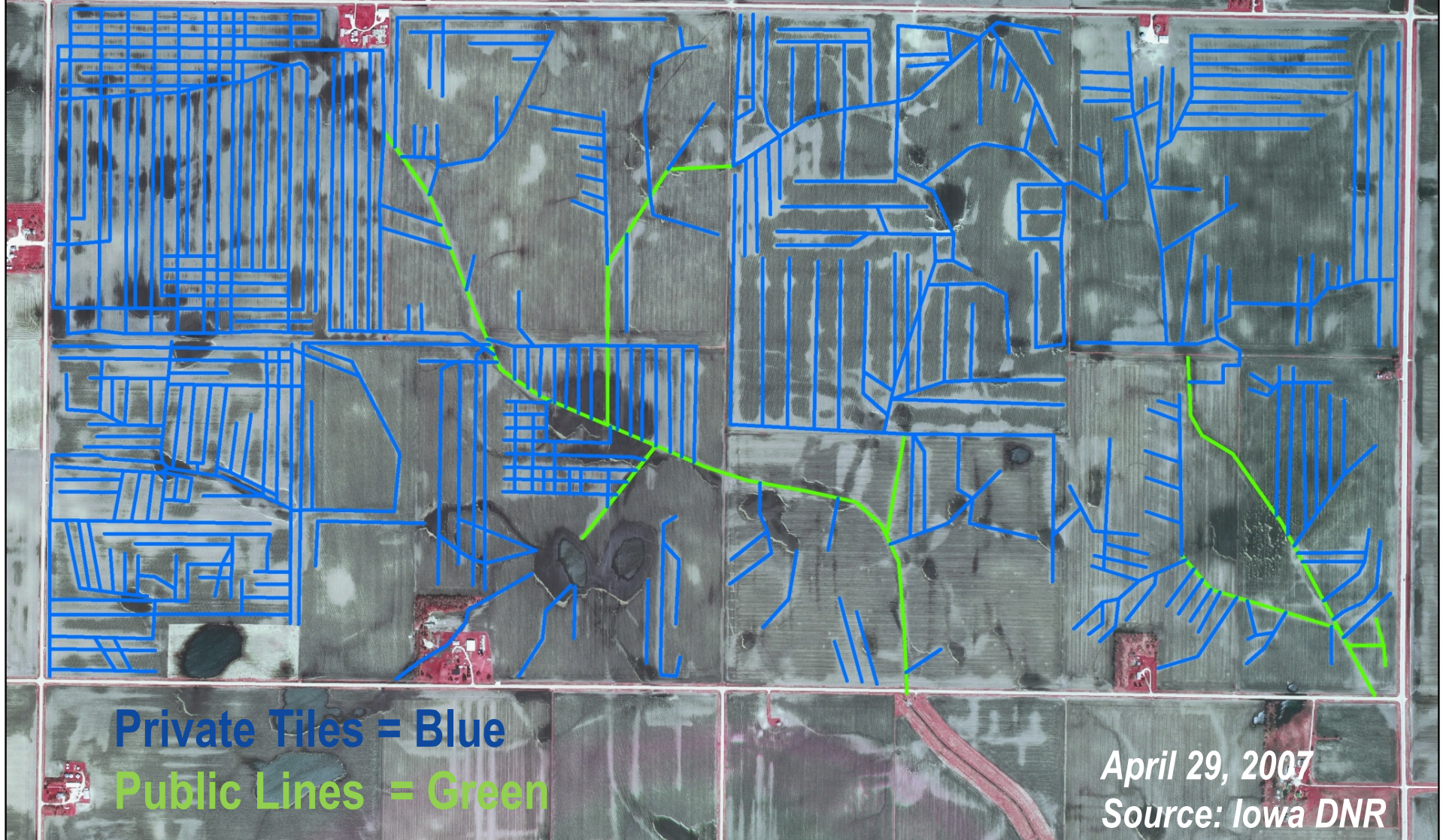
**Regulate to treat at
the point of
discharge of outlet**



Iowa's Pattern Tiling System

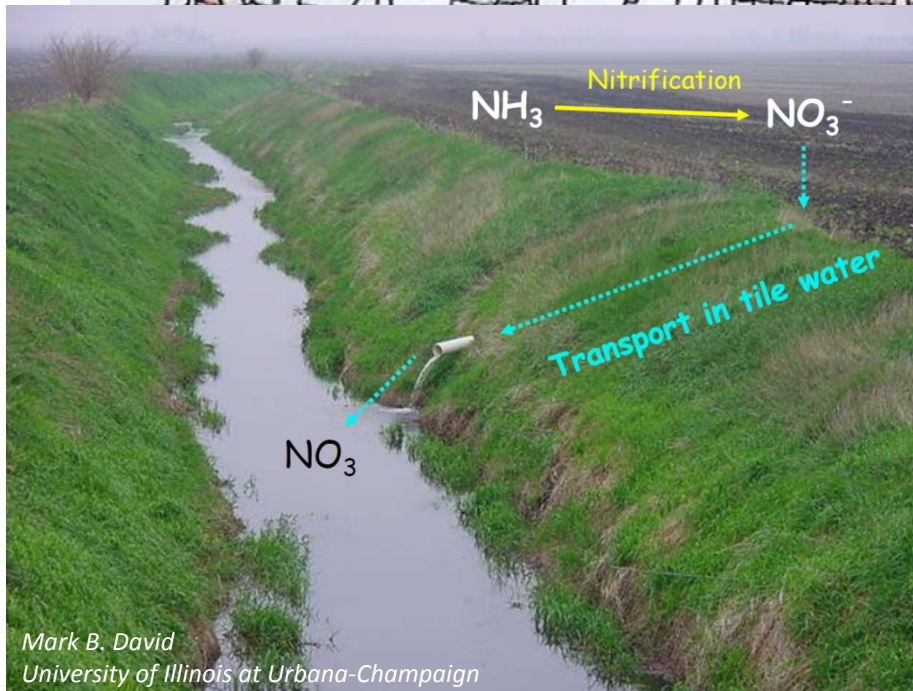
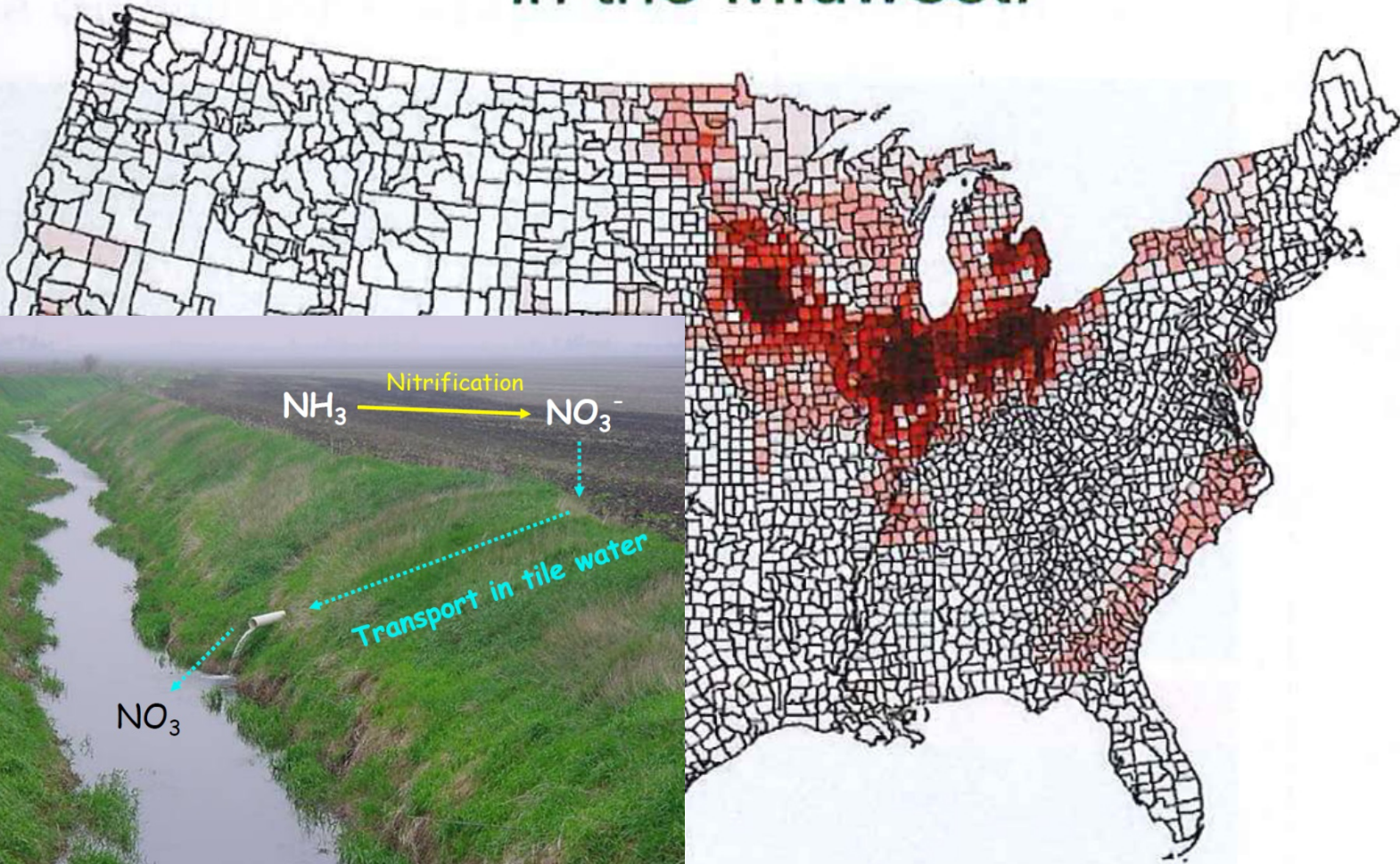
2 square miles in Hamilton County, Iowa

Public tile ~3 miles with private tile ~56 miles



What's Unique About River Waters in Central Iowa?

Subsurface “tile” drainage is concentrated in the Midwest.



Mark B. David
University of Illinois at Urbana-Champaign

Source: World Resource Institute



Source: Circle of Blue

Sac County/Calhoun County/Buena Vista County Nitrate Sampling

Location	DD86, DD2 (Sac) and DD51 (Calhoun)	DD81, DD79, DD83, DD19 (Sac), DD26 (Buena Vista)	DD42
Site Code	SC15	SC19	SC20
28-Mar			0
1-Apr			2.6
8-Apr			0.04
15-Apr			0
22-Apr			0
29-Apr			2.8
6-May			2.21
13-May			0.38
20-May			1.11
28-May			0.01
2-Jun			0.01
10-Jun	29.34	0.48	3.19
17-Jun	21.28	15.9	10.39
24-Jun	35.21	19.42	6.42
1-Jul	18.16	11.43	1.5
8-Jul	5	18.31	12
15-Jul	37.67	18.77	17.31
22-Jul	31.08	11.57	9.63
29-Jul	28.27	5.95	2.64
5-Aug		1.08	0
12-Aug	29.37	7.25	3.52
19-Aug	18.77	2.1	1.23
26-Aug	13.49	1.15	0.35
4-Sep	30.55	18.79	11.71
9-Sep	31.8	20.07	17.58
16-Sep	34.35	20.61	21.27
23-Sep	34.21	20.64	20.24
30-Sep	33.72	19.96	21.51
7-Oct	34.76	21.11	21.74
15-Oct	32.17	19.12	19.58
21-Oct	32.36	17.47	18.85
28-Oct	30.15	18.28	18.49
4-Nov	31.78	17.68	19.53
11-Nov	33.33	16.23	20.63
18-Nov		16.18	21.91
25-Nov	31.04	14.13	20.39
2-Dec		14.12	19.3
10-Dec	30.63	12.52	15.84
17-Dec	28.15	14.76	12.97
30-Dec			

10- 14.99 mg/L
 15- 19.99 mg/L
 ≥20.00 mg/L

Sac County/Calhoun County/Buena Vista County Nitrate Sampling

Location	DD83, DD19 (Sac), DD26 (Buena Vista), and DD69	DD79	DD65
Site Code	SC32	SC34	SC36
28-Mar			4.12
1-Apr			3.18
8-Apr			4.63
15-Apr			4.31
22-Apr		9.15	6.13
29-Apr		13.23	4.49
6-May		8.61	5.8
13-May	10.78	25.78	15.44
20-May	35.23	15.36	11.48
28-May	0.01	13.35	10.27
2-Jun	0.58	22.25	12.8
10-Jun	2.18	24.37	
17-Jun	16.45	18.9	17.35
24-Jun	5	33.22	15.04
1-Jul	15.01		7.31
8-Jul	21.15	33.36	14.12
15-Jul	21.33	22.03	22.35
22-Jul	15.41	39.31	19.76
29-Jul	9.06	33.55	17.7
5-Aug	2.36	23.78	13.22
12-Aug	5.98	29.18	18.09
19-Aug	2.35	24.97	15.09
26-Aug	2.97	22.56	13.43
4-Sep	18.94	25.1	16.11
9-Sep	20.39	27.63	20.88
16-Sep	22.37	28.69	20.95
23-Sep	22.86	29.39	21.04
30-Sep	22.61	30.35	20.94
7-Oct	23.57	29.88	20.88
15-Oct	21.31	28.66	19.82
21-Oct	19.9	28.78	17.41
28-Oct	21.85	29.66	19.01
4-Nov	20.44	28.7	18.19
11-Nov	20.31	29.39	16.97
18-Nov	19.57	29.3	17.16
25-Nov	18.41	28.21	15.61
2-Dec		28.94	16.83
10-Dec	16.11	26.95	15.2
17-Dec	16.13	32.42	14.43
30-Dec		26.77	16.53

10- 14.99 mg/L
 15- 19.99 mg/L
 ≥20.00 mg/L

Sac County/Calhoun County/Buena Vista County Nitrate Sampling

Location	DD19 (Sac) and DD26 (Buena Vista)	DD32	DD64 (Sac) and DD105 (Buena Vista)
Site Code	SC43	SC47	SC52
28-Mar			
1-Apr			
8-Apr			
15-Apr		9.65	6.8
22-Apr		9.92	4.97
29-Apr		9.16	11.26
6-May		8.81	9.8
13-May	20	22.37	21
20-May		14.28	13.84
28-May		11.8	5.23
2-Jun		14.66	14.71
10-Jun		16.18	15.83
17-Jun		25.32	16.68
24-Jun		28.47	24.26
1-Jul	16.45	17.09	14.65
8-Jul	25.37	26.41	23.29
15-Jul	28.3	24.53	21.44
22-Jul		22.78	18.18
29-Jul	21.32		15.67
5-Aug	18.31	25.05	12.18
12-Aug	24.45	17.34	16.15
19-Aug	17.26	17.31	13.58
26-Aug	17.06	15.3	17.74
4-Sep		19.18	13.25
9-Sep	20.46	26.6	16.36
16-Sep	20.86	23.78	
23-Sep	21.15	20.34	17.51
30-Sep	23.12	20.35	17.45
7-Oct	19.36	19.89	16.71
15-Oct	27.36	19.69	16.76
21-Oct	18.98	19.01	15.99
28-Oct	19.5	28.26	16.23
4-Nov	19.61	19.47	16.05
11-Nov	19.22	19.18	15.17
18-Nov	18.31	19.54	15.46
25-Nov	19.32	19.16	14.79
2-Dec	13.1	19.69	15.41
10-Dec	23.31	19.11	14.7
17-Dec	15.44	16.92	13.71
30-Dec	17.81	19.12	14.97

10- 14.99 mg/L
 15- 19.99 mg/L
 ≥20.00 mg/L



What is a Drainage District?

- Public utility chartered to drain water from agricultural ground (under Ch. 468, Code of Iowa)
- Iowa legislative priority in 1890s
- Taxing authority over benefited farms
- Overseen by Boards of Supervisors in county served or elected trustees
- Historically focused solely on moving water downstream without regard to water *quality* and *quantity* impacts



Denitrification Costs

Additional cost to meet EPA drinking water standard

2013 Costs

Treatment Cost \$722,500

Lost Revenue \$186,200

Total 2013 Expense \$908,700

2014-2015 Costs

Treatment Cost \$1,500,000

Total 14-15 Expense \$1,500,000

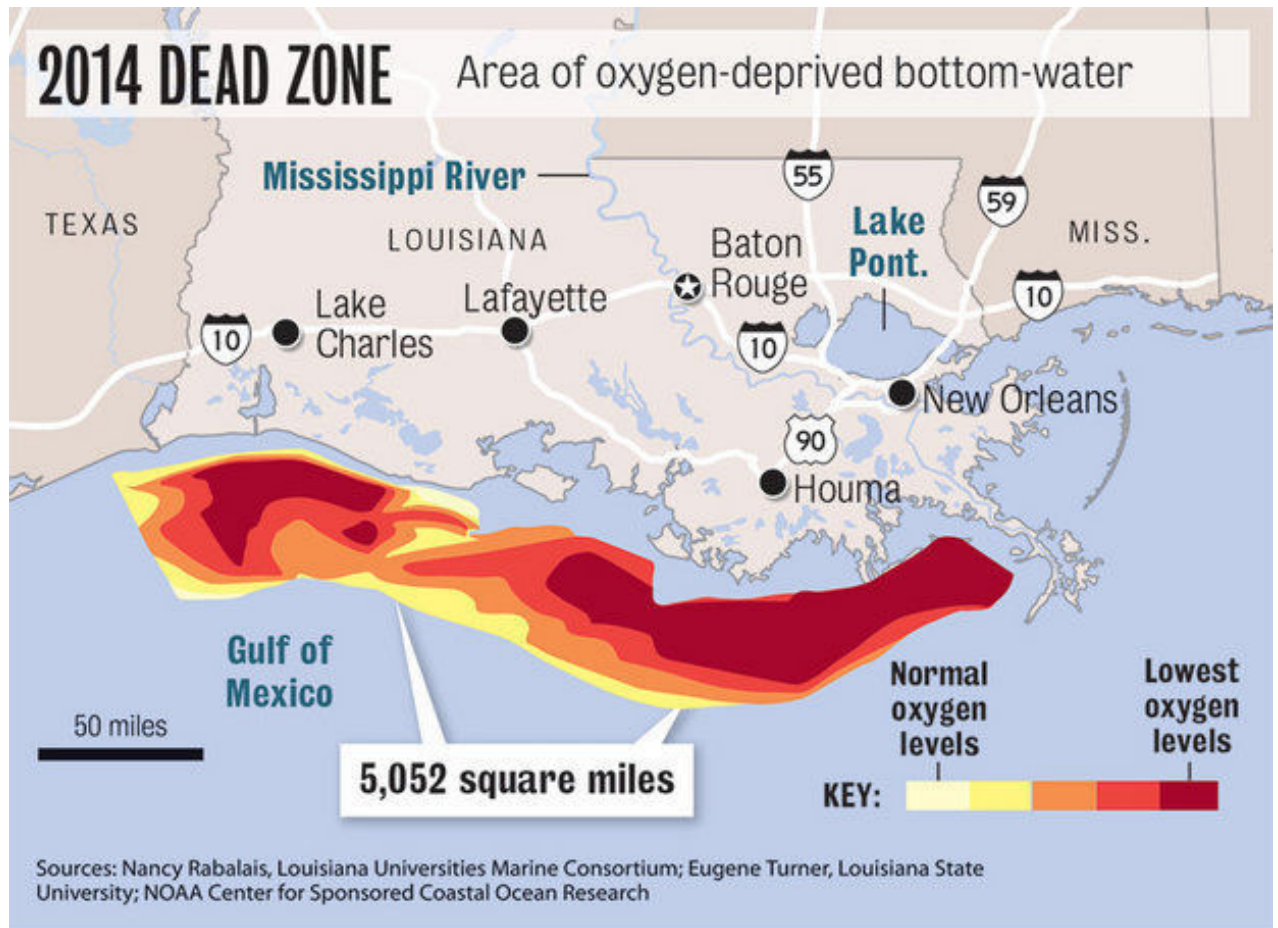


Estimated Cost for New Denitrification Facility

\$76 million – \$183 million

Paid for by DMWW ratepayers

Gulf of Mexico Dead Zone at 5 Year Average: Nutrient Reduction Strategy



Iowa Nutrient Reduction Strategy: Iowa Public Policy Approach

- *Sources not currently regulated account for 92% of the total nitrogen
 - * Nutrient Reduction Strategy incorrectly labels these as “non-point sources”
- Reduce nutrient pollutants by 45%
 - No timelines
 - No commitments to measurement or metrics
 - No resource commitments to voluntarism
- Regulate 10% of nutrient contributors and pursue voluntarism (non-regulation) of 90%



Impending “Tragedy of the *Unregulated Commons?*”

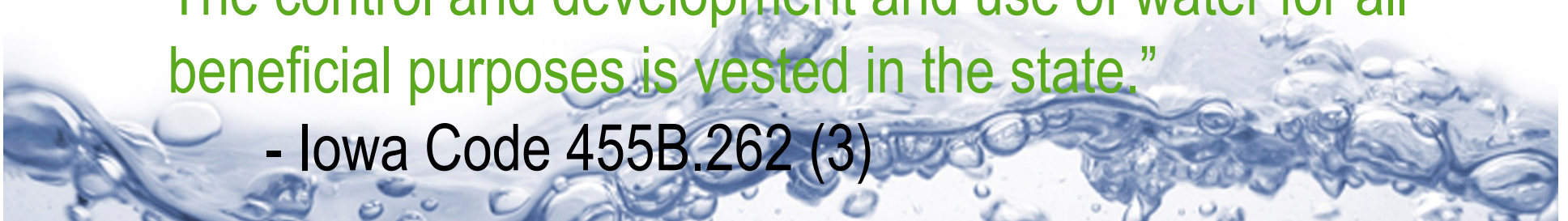
- Iowa’s water use is based on riparian water rights which are derived from the ownership of land adjacent to a river or stream. That owner has the right to reasonable use of the water which the land is adjacent to, so long as that reasonable use does not harm another’s use.

**“The land might be yours,
but the water belongs to all of us.”**

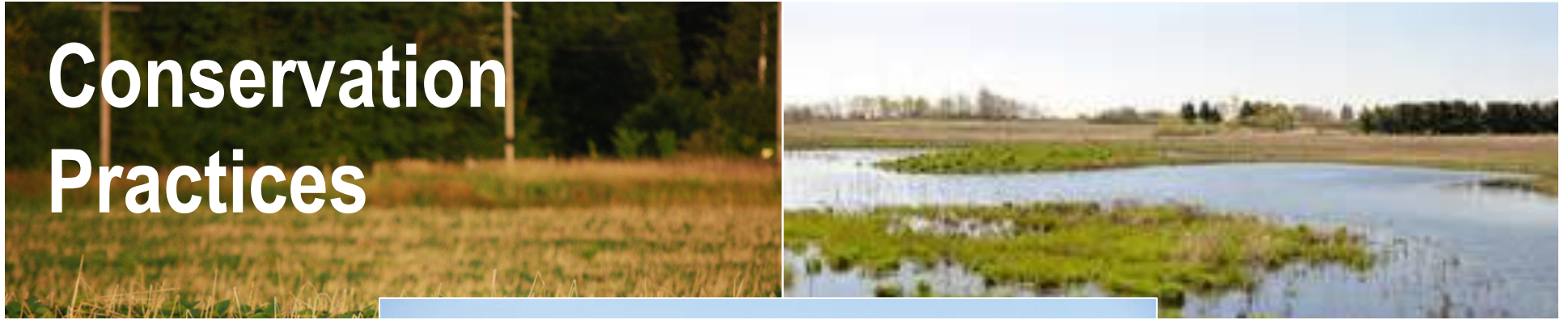
- Governor Mark Dayton (D-MN)

- “Water occurring in a basin or watercourse ...is public water and public wealth of the people of the state ... The control and development and use of water for all beneficial purposes is vested in the state.”

- Iowa Code 455B.262 (3)




Conservation Practices



“There is no single strategy to effectively reduce nitrate loss. Individual farms will require different combinations of nitrate strategies...All the scenarios require high levels of implementation of a wide variety of methods... All landowners in Iowa will need to engage in nutrient reduction strategies if we are to reach our water quality goals.”

*- Michael Castellano and Matthew Helmers, Iowa State University
The Des Moines Register, April 12, 2015*





**No other business besides agriculture
can run a pipe without regulation
into the Waters of the State**

Sac County, Iowa

Regulation Protects Community Interests

- **Pharmaceuticals** → Patient Safety
- **Restaurants** → Patron/Public Safety
- **Air Traffic** → Travelers/Commerce Safety
- **Traffic Laws** → Motorist Safety
- **Air Quality** → Human and Wildlife Safety
- **Water Quality** → Heavily regulated in urban environment, but voluntarily “regulated” in agriculture

Has voluntary environmental protection worked?

DDT... Lead in gasoline ... Phosphorus in detergents

Des Moines Water Works Business Commitment and Surface Water Strategy

**Invest in
Infrastructure** + **Improve
Technologies** + **Advocate for
Clean Water**

=

Regulate to Protect Source Waters

Safe, Affordable and Abundant Water You Can Trust for Life



**clean
water** is for **life**



Des Moines Water Works

Water You Can Trust for **Life**

www.dmww.com |   | dsmh2o.com

Customer Service: (515) 283-8700 | 24/7 Emergency: (515) 283-8772

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“Simple Molecule, Complex Commodity”

Solvents and Solutes →
water assumes some
characteristics of
materials it contacts

