Water Quality Wetlands in Iowa

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IOWA NUTRIENT RESEARCH & EDUCATION COUNCIL

IowaNREC.org

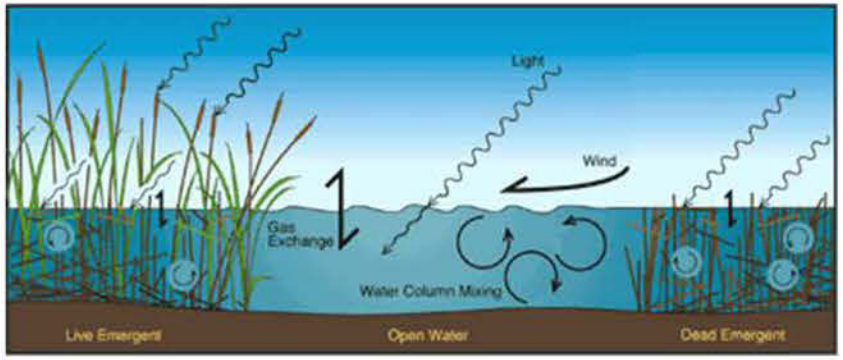
Agriculture. Science. Environment.

Water Quality Wetlands in Iowa

Outline:

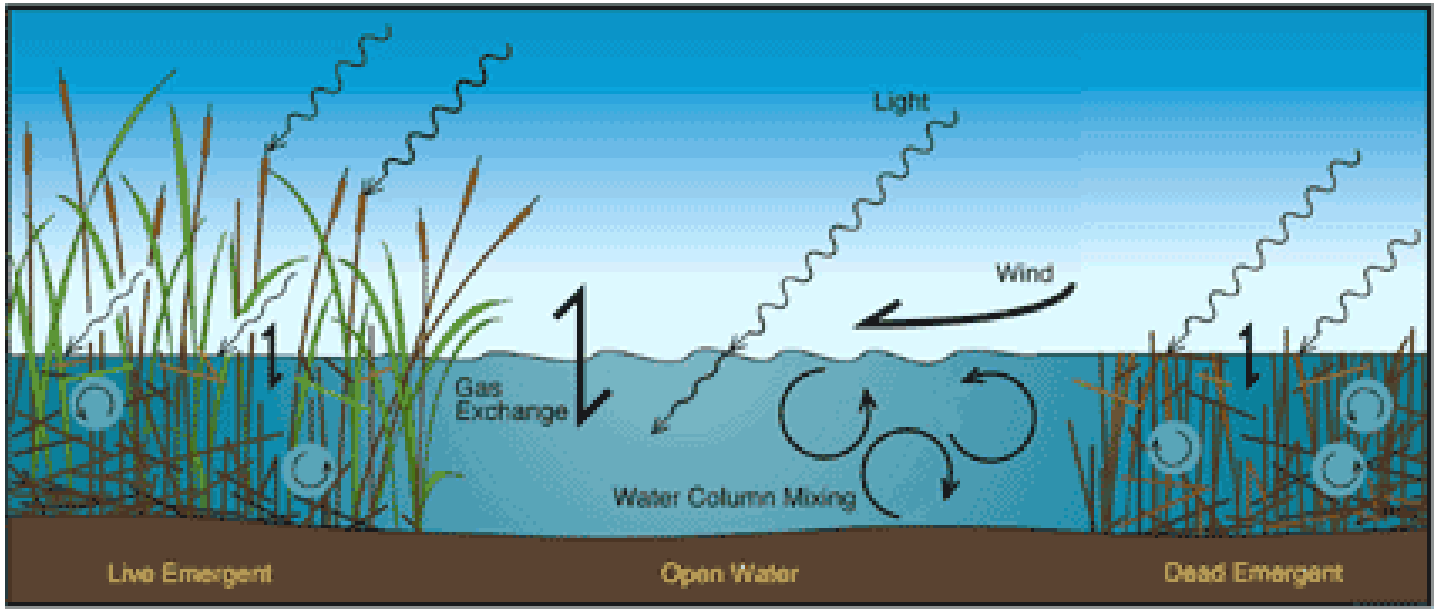
- Performance Monitoring & Research
- Siting & Design
- Program Vehicles & Market Driven Opportunities

Wetlands Research



Factors Affecting Wetland Performance

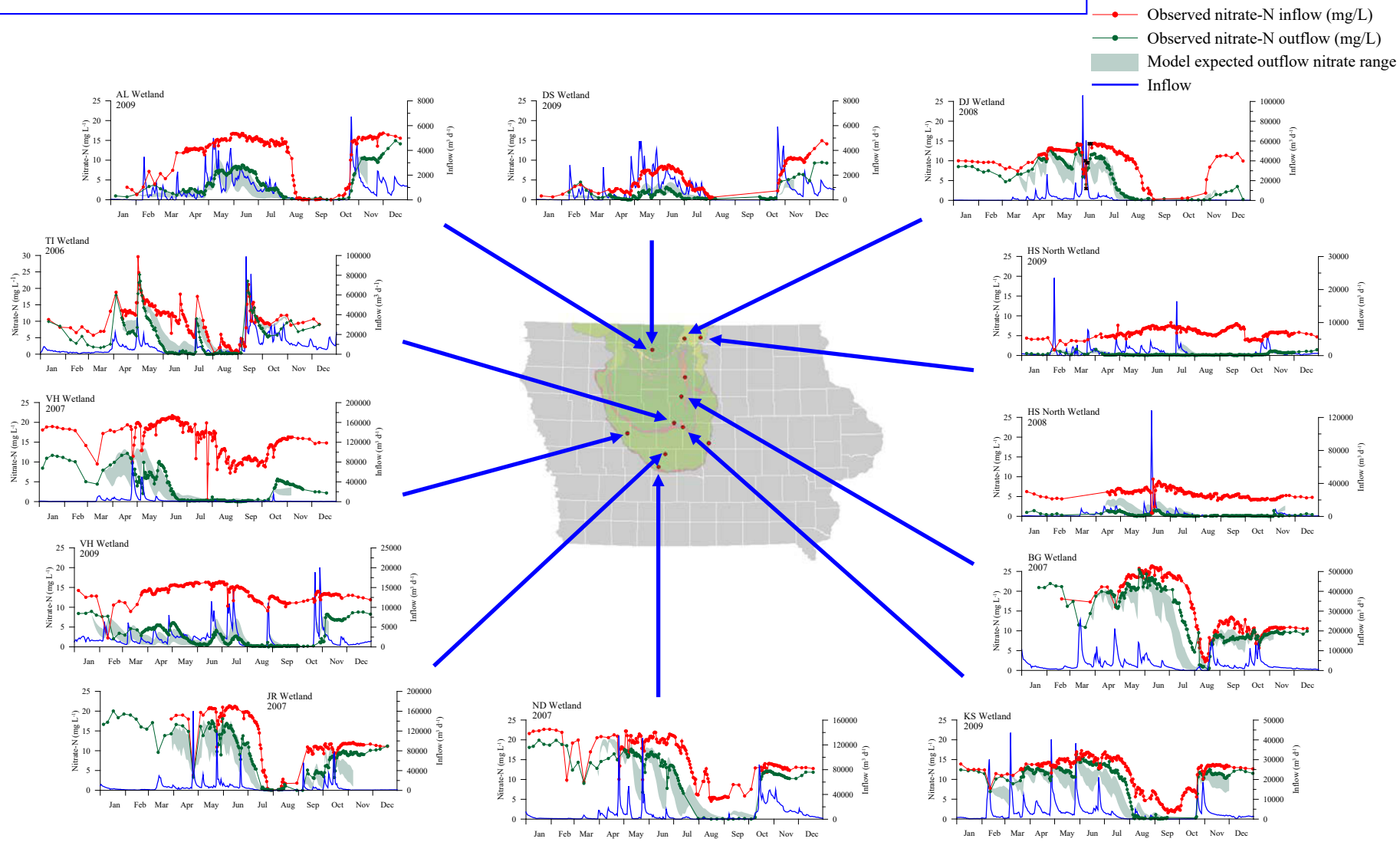
Wetland dynamics
- Vegetation, temperature, dissolved oxygen
- Residence time
- Hydraulic loading rate
- Nitrogen loading rate



NPS Nitrate Loading and Nitrate Loss in Wetlands

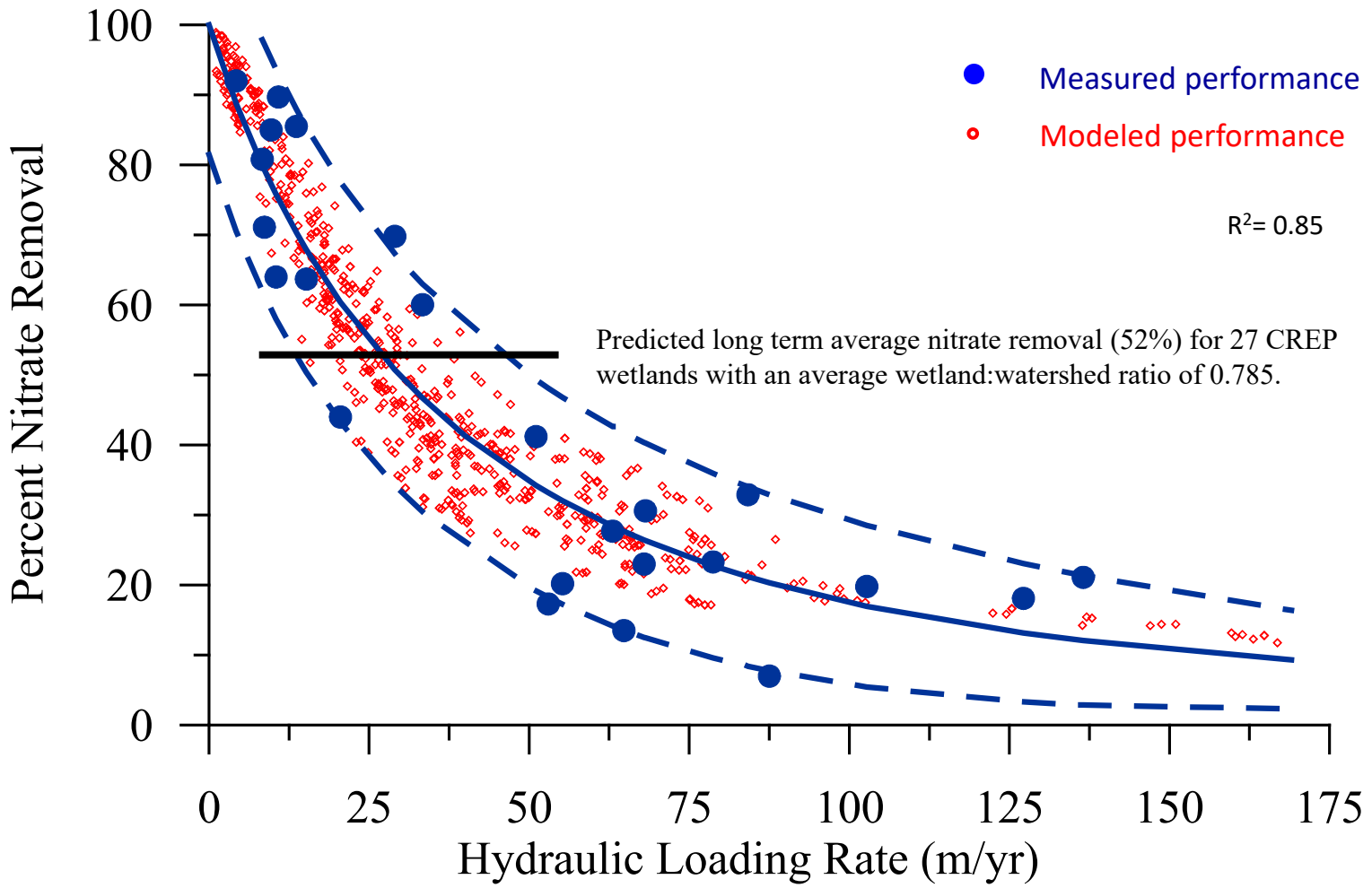
Despite a wide range in nitrate loads, all of the wetlands monitored were net sinks for nitrate and total nitrogen.

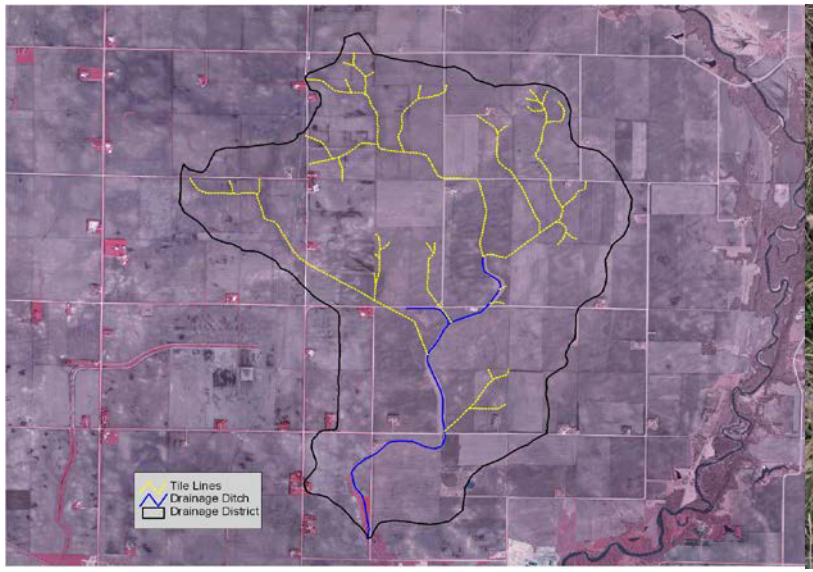
Examples from 2007 to 2009 monitoring



Measured and Modeled Wetland Performance

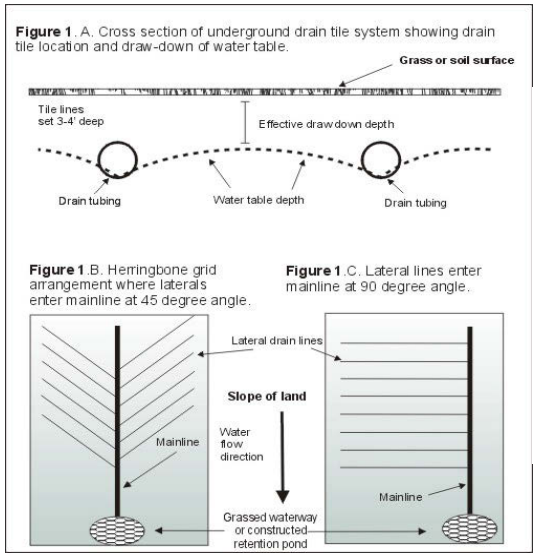
Hydraulic loading rate, nitrate concentration, and temperature are primary determinants of wetland performance.

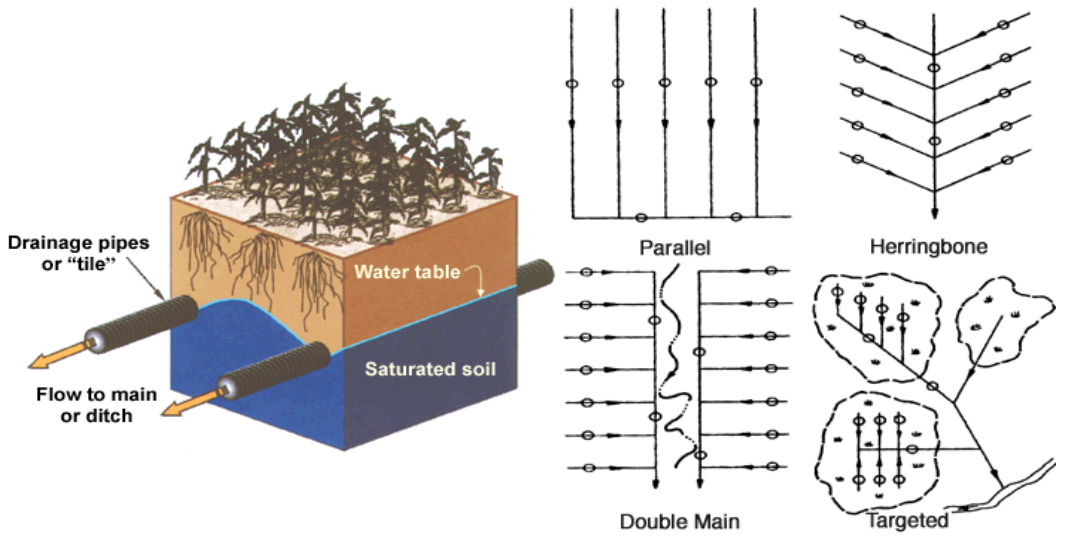


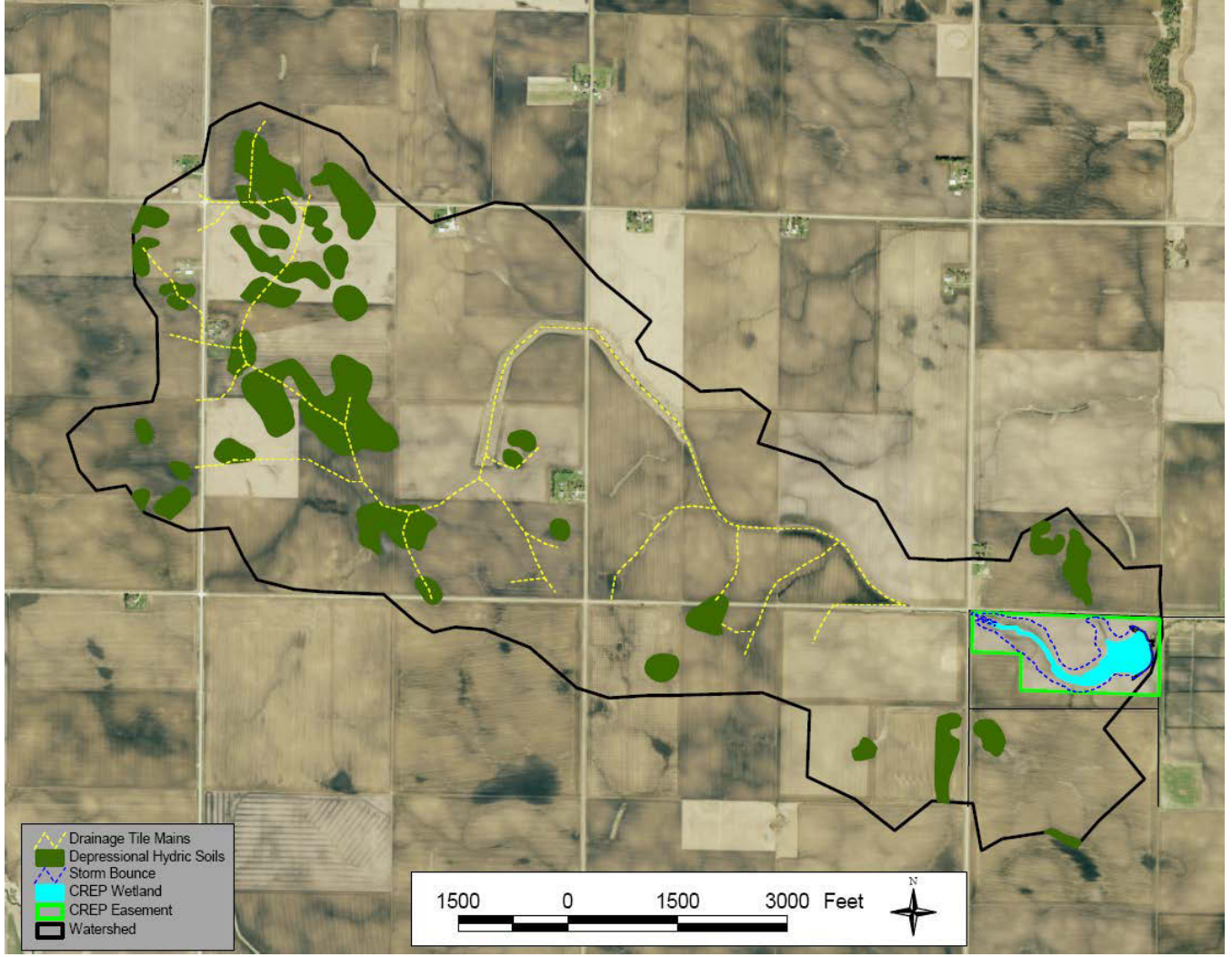


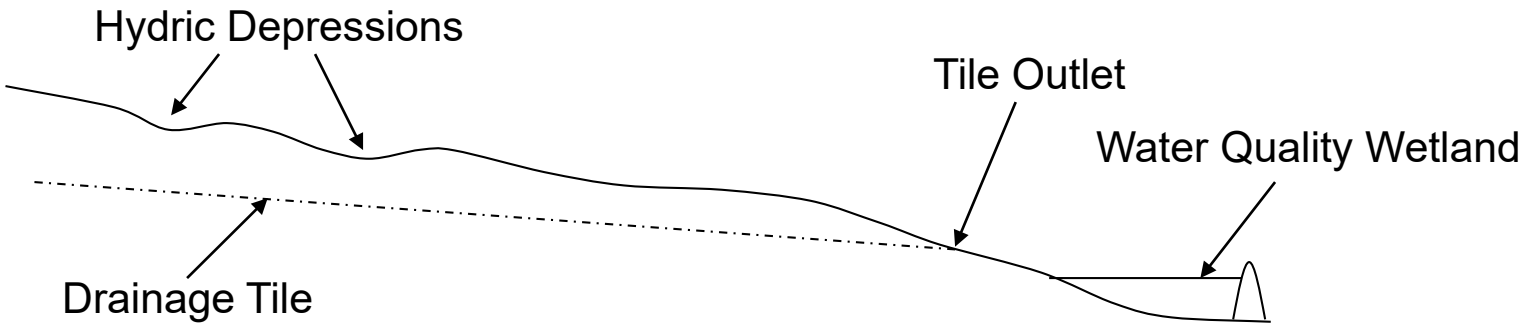
Strategic Wetland Targeting

- Watershed area between 500-4000 acres
- Wetland sized at 0.5% to 2% of watershed area, i.e. a 1,000 acre watershed would require a wetland between 5-20 acres in size
- To maintain wetland vegetation, no more than 25% of the wetland should be >3 feet in depth
- Designed so that placement of the wetland does not adversely impact drainage rights of upstream and downstream landowners
- Strategic placement of wetlands is crucial to achieve significant reductions in nitrate

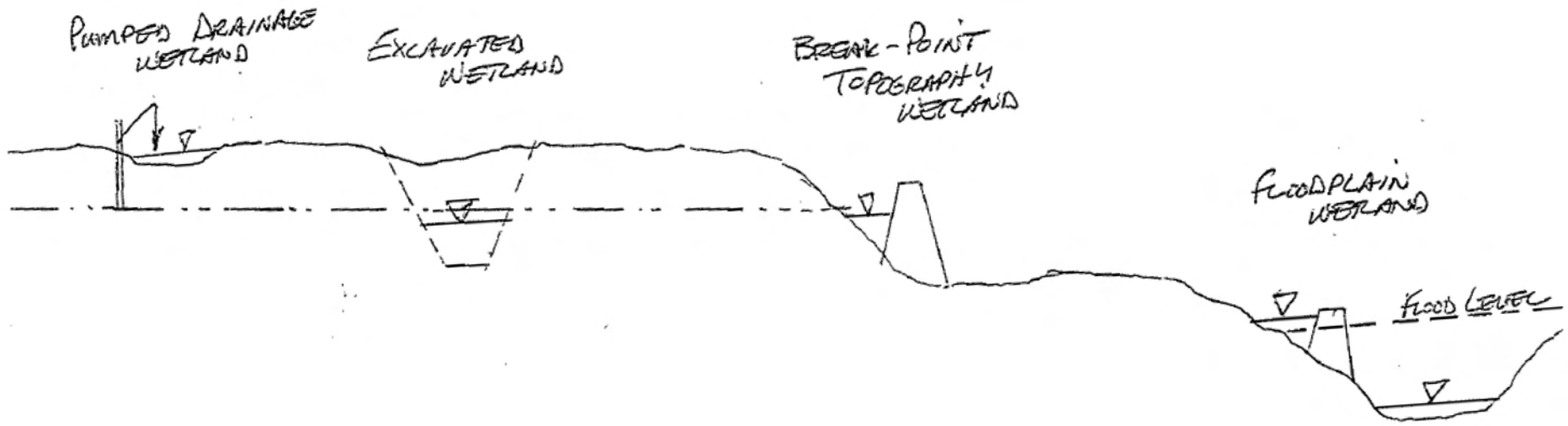


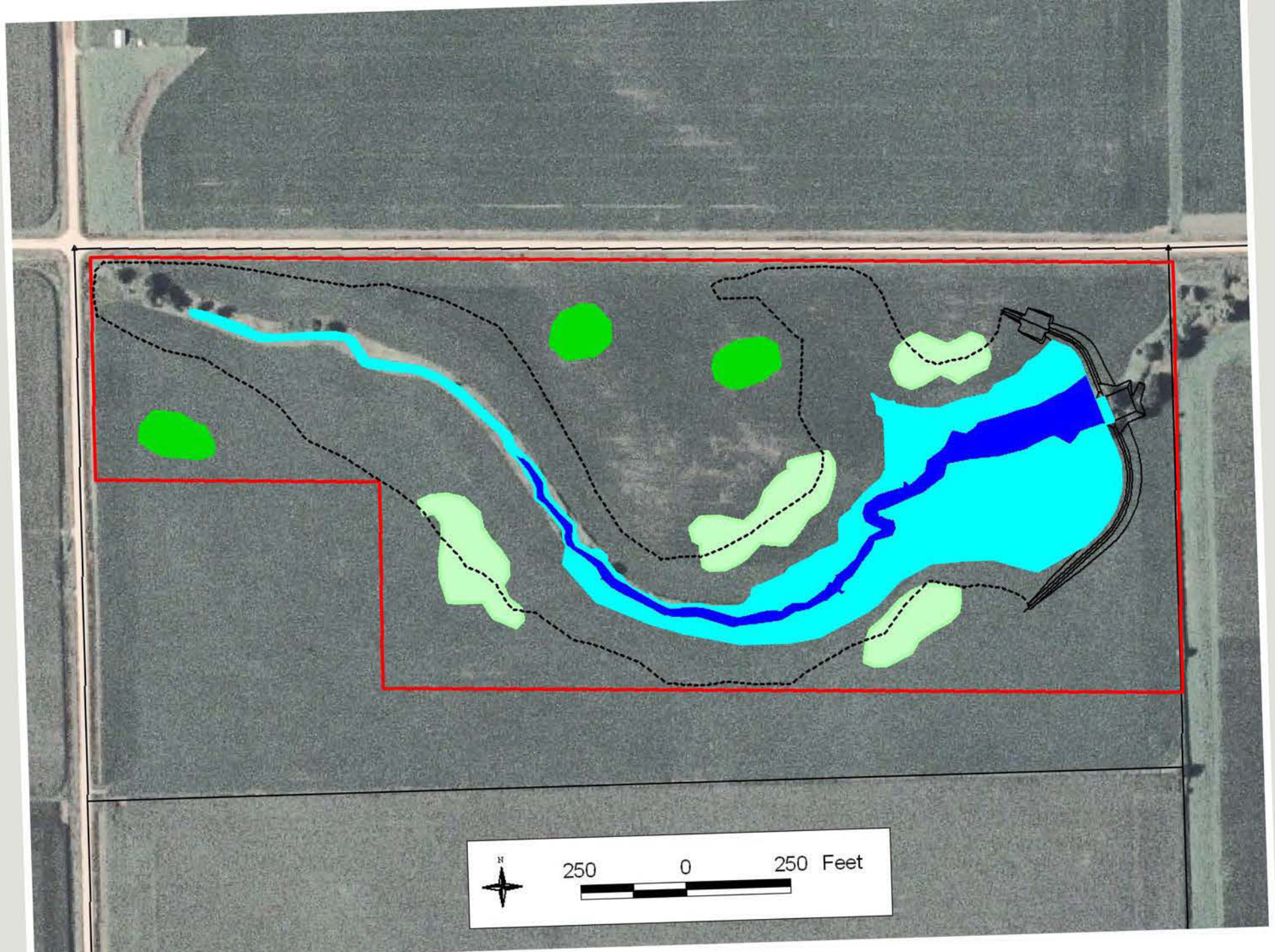



Drainage Tile Mains
Depressional Hydric Soils
Storm Bounce
CREP Wetland
CREP Easement
Watershed
1500 0 1500 3000 Feet
N


Hydric Depressions
Tile Outlet
Water Quality Wetland
Drainage Tile

TOPOGRAPHIC SITING OPTIONS
- N REMOVAL WETLANDS




N
250
0
250 Feet

Benefits of Integrated Drainage and Wetland Systems

- Reduce the loss of nitrate
- Increase habitat and ecological functions of the landscape
- Reduce N_2O greenhouse gas emissions
- Reduce surface runoff
- Reduce loss of surface runoff contaminants (e.g. phosphorus, pesticides, sediment)
- Optimize crop production, yield, and profitability

For More Information

http://iowalandscapeinitiative.com/

Future Need Under Iowa NRS

- 4,000-7,000 wetlands (in addition to other practices) to meet scenarios of Iowa Nutrient Reduction Strategy for achieving 45% N reduction
- Resulting In:
  - 40,000-70,000 acres of wetland
  - N removal of 60M-105M lbs/yr

Program Vehicles & Market Drivers

State/Federal Programs

- Iowa Conservation Reserve Enhancement Program (CREP) – IDALS/FSA
- Iowa Water Quality Initiative - IDALS
- State Revolving Fund Sponsored Projects - DNR
- Environmental Quality Incentives Program (EQIP) – NRCS

Market Driven Opportunities

- Farmed wetland mitigation needs
- Nutrient credit markets

Thank You!

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