Iowa's Conservation Reserve Enhancement Program

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WHAT IS CREP?

- Partnership between USDA-FSA, Landowners, and IDALS
- Began 15 years ago in Iowa
- Iowa’s CREP is based on wetland research conducted at ISU – Targeted water quality approach
- To date 83 CREP wetlands have been built

PROGRAM REQUIREMENTS

- Sites must be in or adjacent to a Des Moines Lobe County
- Watershed feeding the wetland must be between 500-4000 acres
- Wetland pool must be between 0.5% and 2% of its watershed area
- At least 75% of the wetland pool needs to be <3 ft. deep
- All tile drainage outlets entering the wetland must outlet at least 1 foot above the full pool level of the wetland

PROGRAM ACCOMPLISHMENTS

- An estimated 85,337 tons of N will be removed over the lifetime of the 83 completed sites
- An average of 1,028 tons of N removed over the 150 year designed lifetime of each site at an average cost of $0.26 per lb.
- 758.6 acres of wetland pool/ habitat
- 104,136 acres of mostly row cropped land treated, on average 1,255 acres drain through and are treated by each CREP wetland

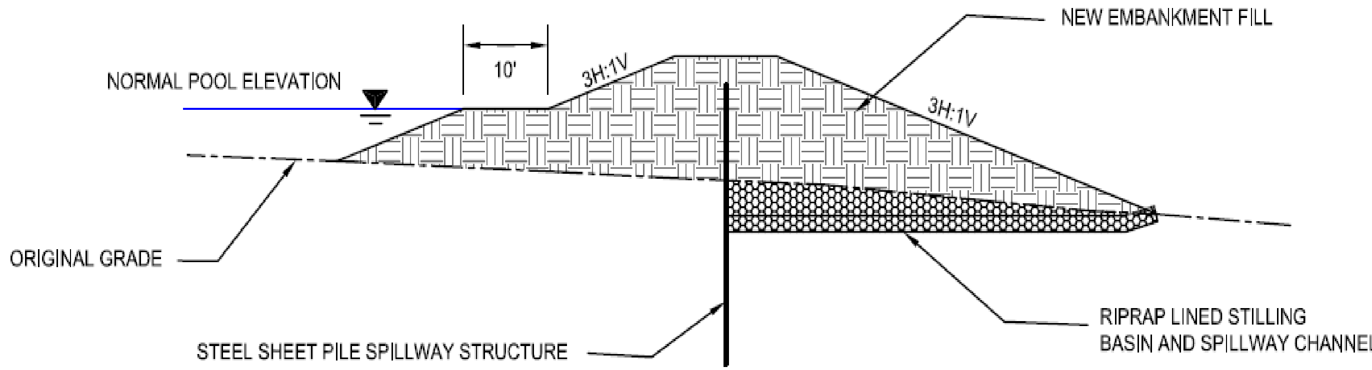
CONSTRUCTION OVERVIEW

- Broad cresting weirs are used to minimize pool elevation bounce and protect drainage rights for adjacent lands.

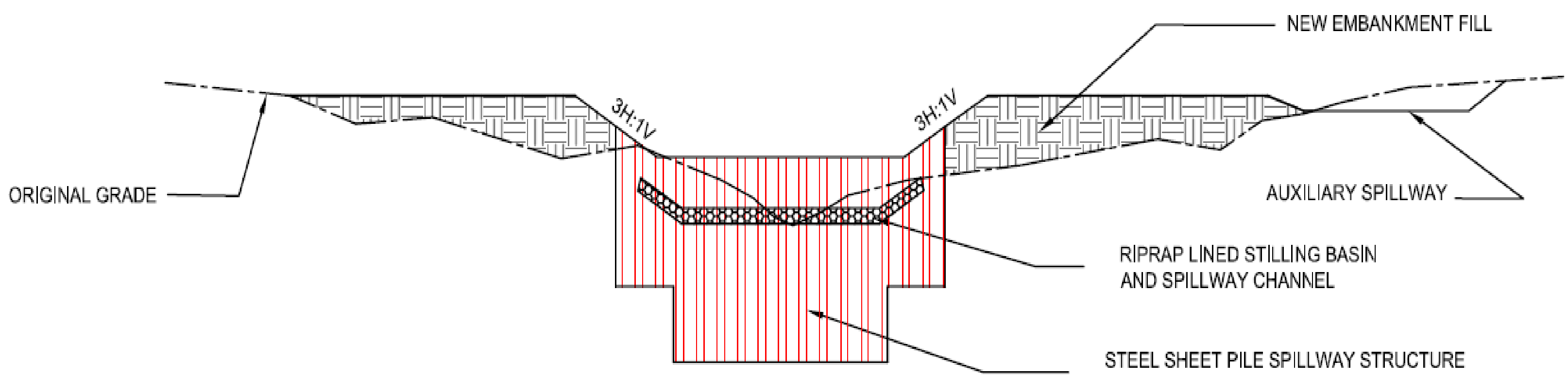
- The structures are full flow allowing surface runoff low in N through the system quickly, and the tile runoff containing more N increased residence time through the wetland.

- A grouted rip-rap plunge pool below the weir serves to dissipate energy

- A draw-down structure is installed in the earthen wetland berm for wetland and berm/buffer vegetation establishment



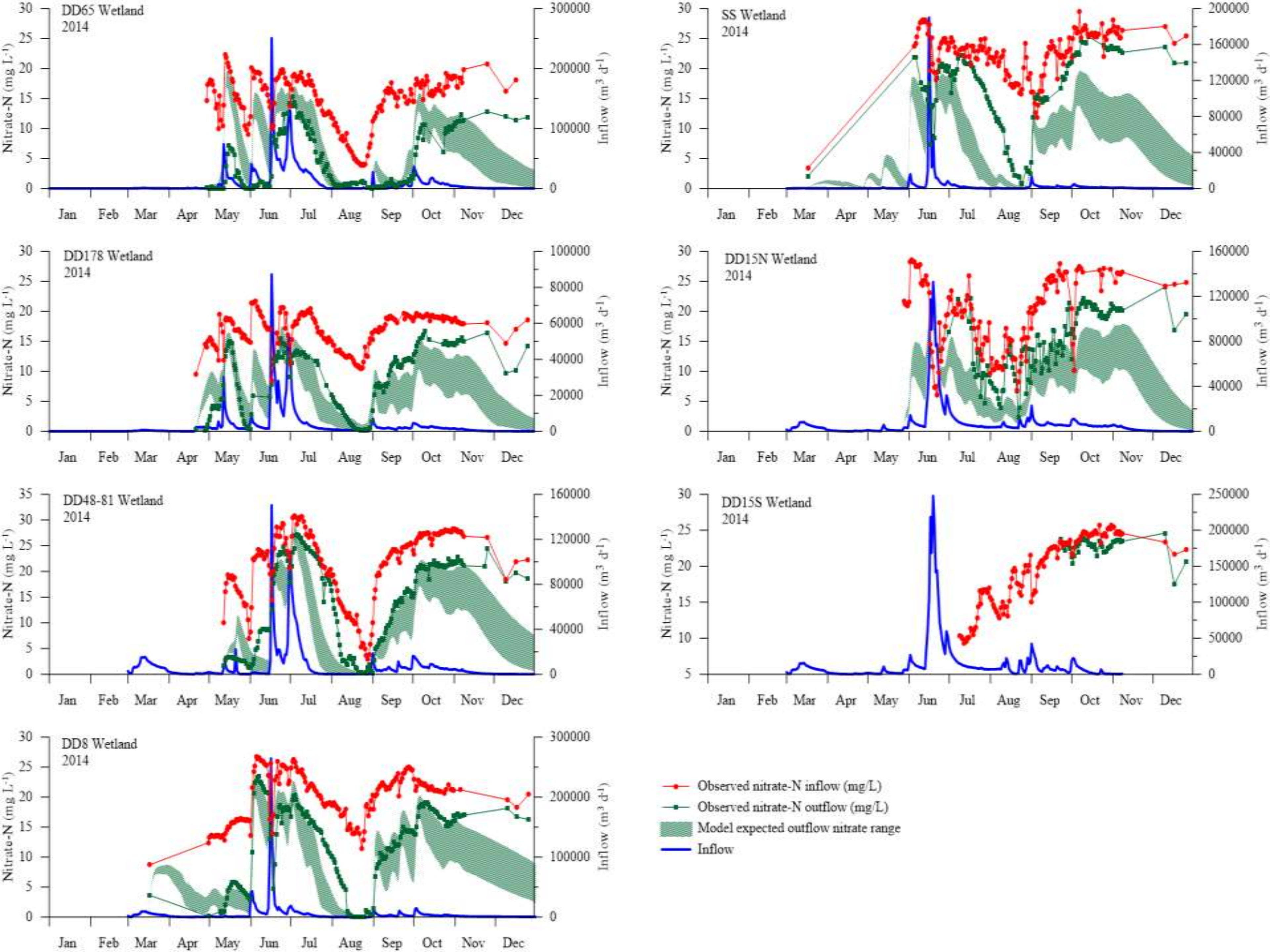
TYPICAL CROSS SECTION OF EMBANKMENT AT SPILLWAY STRUCTURE



TYPICAL CROSS SECTION OF WATERWAY AT SPILLWAY STRUCTURE

CREP and DENITRIFICATION!

- Iowa’s Nutrient Reduction Strategy lists an average 52% N reduction for targeted water quality wetlands
- The maximum recorded N reduction for a CREP site is 92%
- As we learn how to design CREP wetlands better we anticipate the levels of N reduction to increase


DD65 Wetland
2014
SS Wetland
2014
DD178 Wetland
2014
DD15N Wetland
2014
DD48-81 Wetland
2014
DD15S Wetland
2014
DD8 Wetland
2014
Nitrate-N (mg L-1)
Inflow (m3 d-1)
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Observed nitrate-N inflow (mg/L)
Observed nitrate-N outflow (mg/L)
Model expected outflow nitrate range
Inflow

Observed and modeled performance of IA CREP wetlands

A unique aspect of the Iowa Conservation Reserve Enhancement Program (CREP) is that nitrate reduction is not simply assumed based on acres enrolled but is calculated based on measured performance of CREP wetlands. Selected wetlands are instrumented for continuous flow measurement and automated sampling at inflows and outflows. Mass balance analyses are used to calculate mass removal rates of nitrate. The wetlands selected for monitoring span a broad range of factors affecting wetland performance including hydraulic loading rate, residence time, nutrient concentration, and nutrient loading rate.

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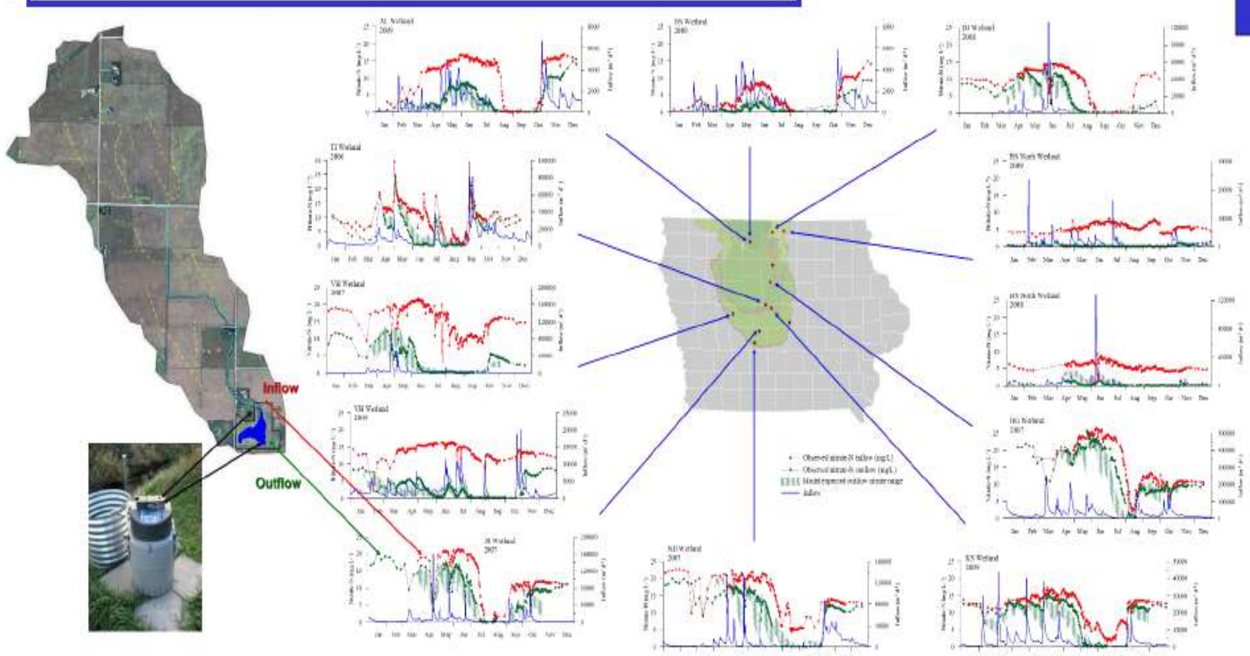
Mass Balance Monitoring of Wetland Performance

Selected wetlands are instrumented for continuous flow measurement and close interval water sampling

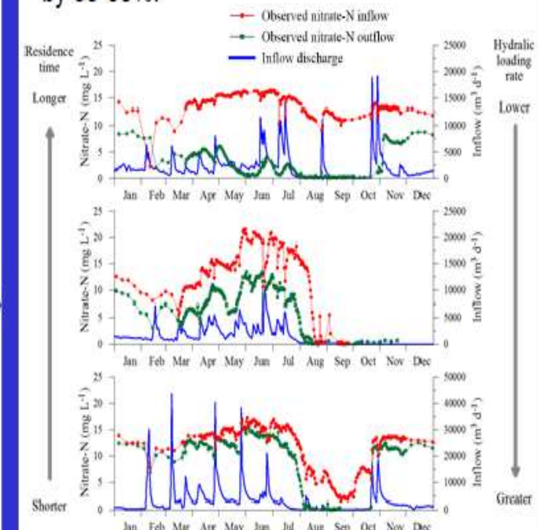


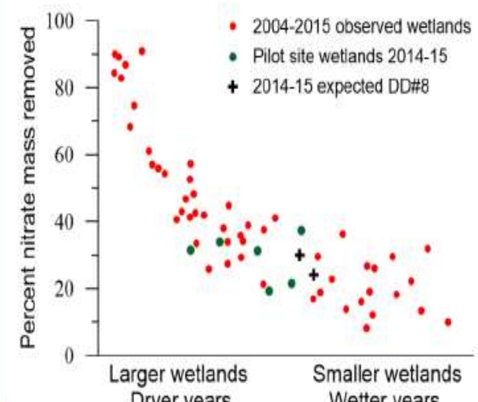
Wetland Performance

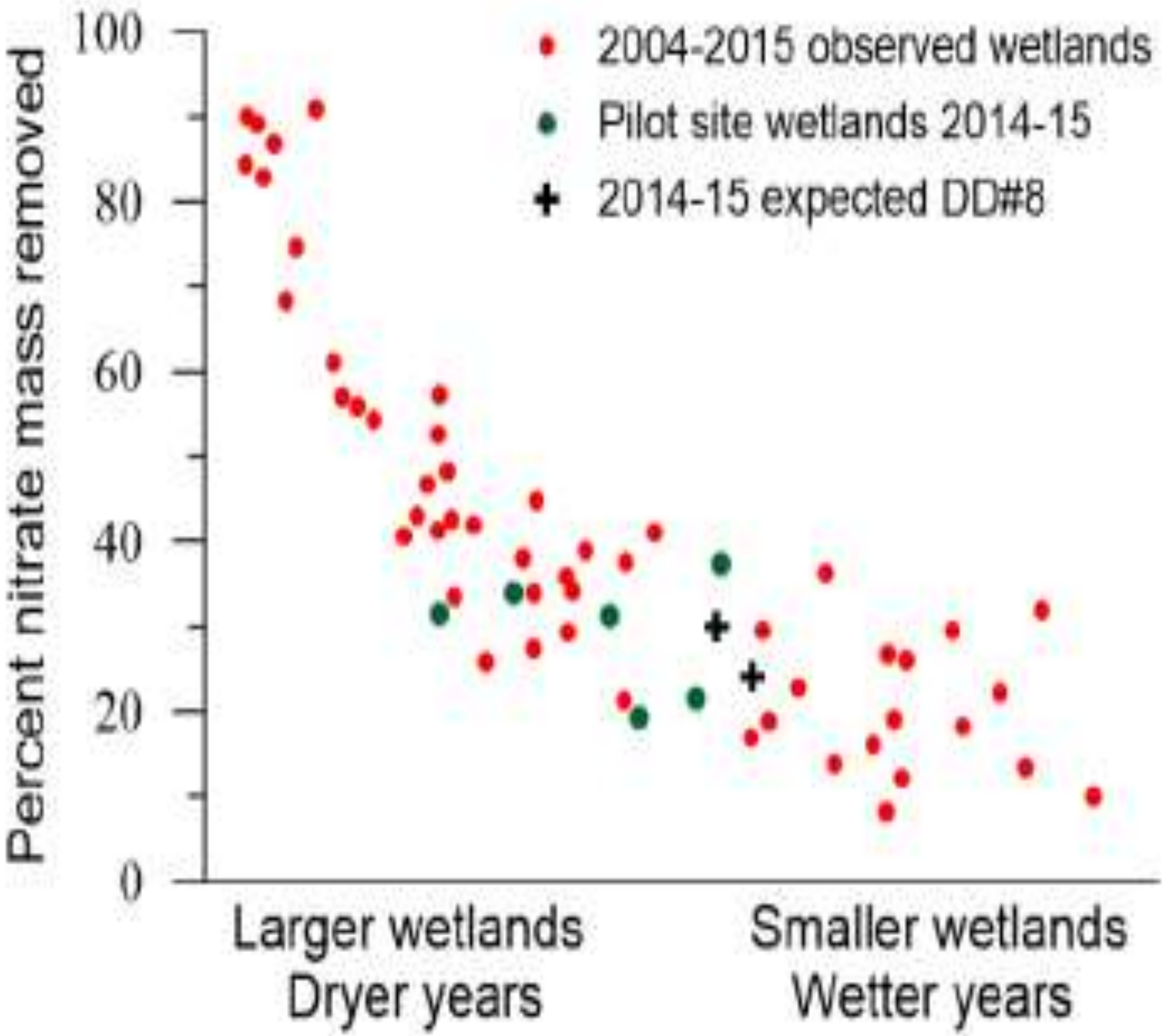
Evaluated using mass balance analysis and modeling

Nitrate removal depends primarily on hydraulic and nitrate loading rates which depend on location, size and weather patterns.

On average, wetlands occupying 0.5-2% of a catchment can reduce long term nitrate loads by 30-80%.







Percent nitrate mass removed
100
80
60
40
20
0
2004-2015 observed wetlands
Pilot site wetlands 2014-15
2014-15 expected DD#8
Larger wetlands
Dryer years
Smaller wetlands
Wetter years

WHAT WILL IT TAKE?

- Iowa’s Nutrient Reduction Strategy lists a 41% N reduction goal from non point source Ag lands

- 21 Million acres of row cropped ground in Iowa. Scenarios range from 27% to 43% of row cropped ground treated with edge of field targeted water quality wetlands

- At an average catchment of 1,000 acres – that’s a range from 5,670 to 9,030 wetlands needed

- A range from $1.1 billion to $1.8 billion

- Large up front construction costs, but low maintenance

How to Sell N-reduction Wetlands

- Drainage coefficient usually increases and never decreases if wetland is designed properly
- Wetlands are typically built where crops don't grow the best compared to other acres on the farm
- May provide an excellent mechanism to avoid future potential regulations on N applications
- Great hunting opportunities and wildlife habitat
- Land still has value and could be sold to county conservation boards or other conservation organizations

Iowa CREP Contact Information

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