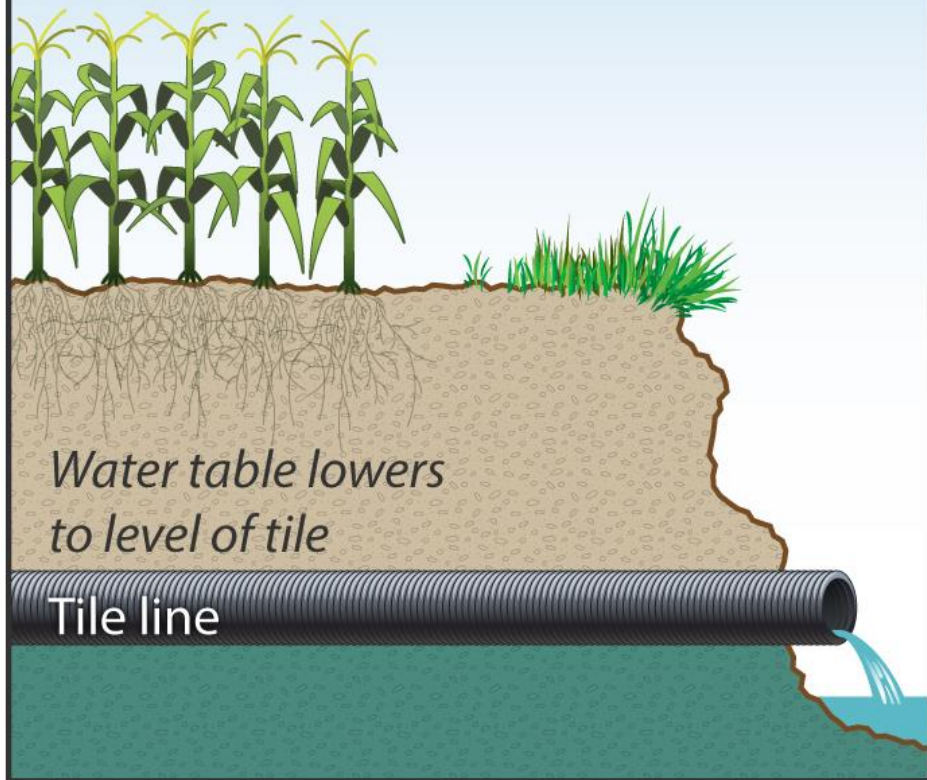


DRAINAGE WATER MANAGEMENT (CONTROLLED DRAINAGE)

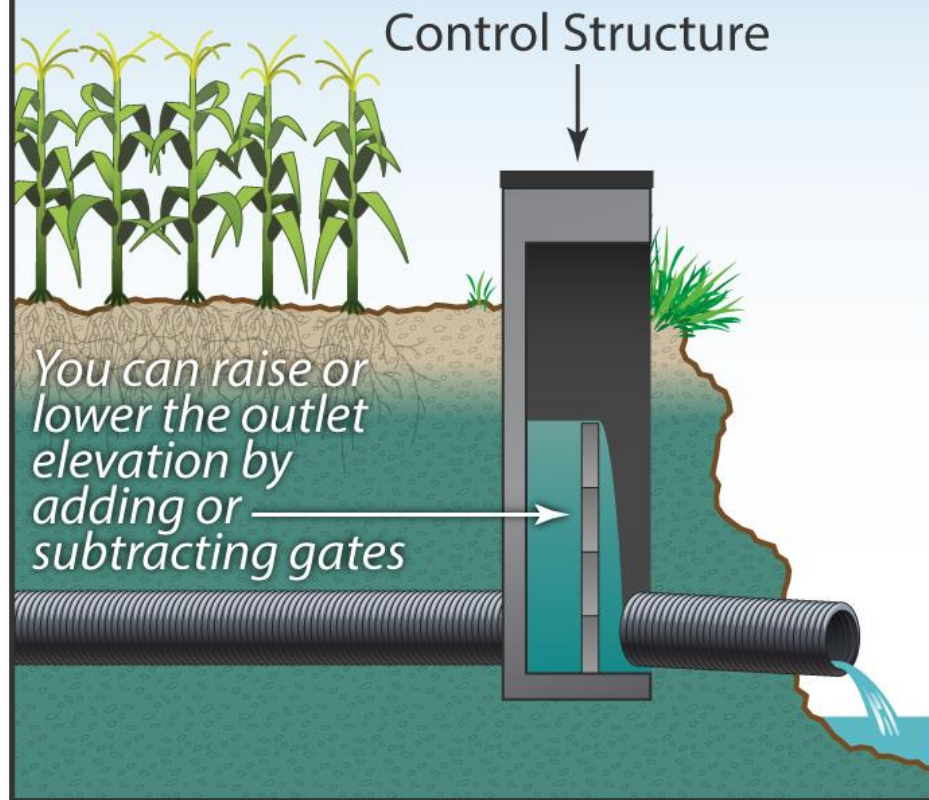
Dr. Laura Christianson
University of Illinois at
Urbana-Champaign

IN-FIELD DRAINAGE SYSTEM PRACTICE: CONTROLLED DRAINAGE

Conventional Drainage



Controlled Drainage

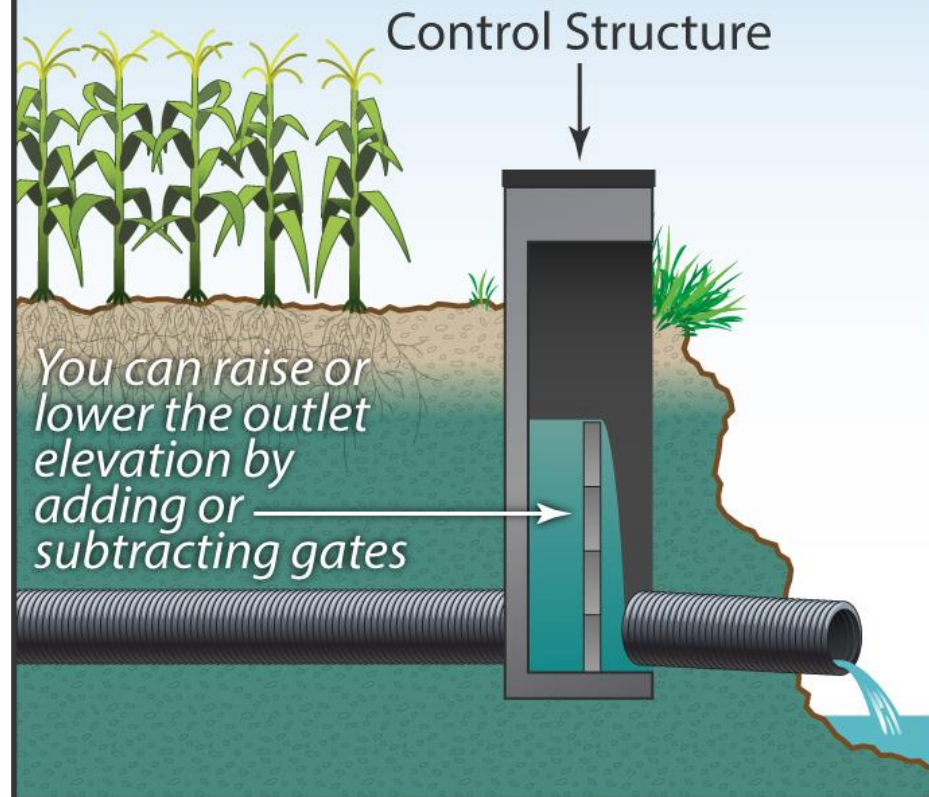


IN-FIELD DRAINAGE SYSTEM PRACTICE: CONTROLLED DRAINAGE

What is it? Adjustable structures to manage the level of the drainage outlet



Controlled Drainage

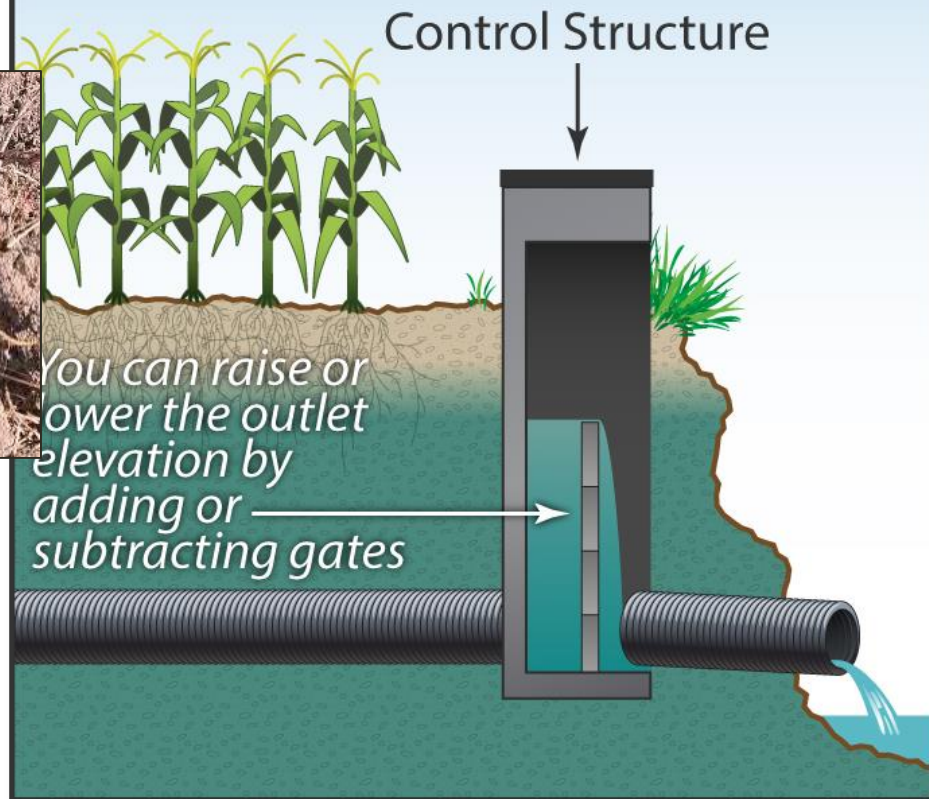


IN-FIELD DRAINAGE SYSTEM PRACTICE: CONTROLLED DRAINAGE

What is it? Adjustable structures to manage the level of the drainage outlet



Controlled Drainage



IN-FIELD DRAINAGE SYSTEM PRACTICE: CONTROLLED DRAINAGE

What is it? Adjustable structures
How does it reduce N loss in drainage? Holds back water and nitrate in the water during periods

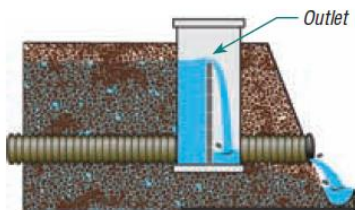


Figure 1. The outlet is raised after harvest to reduce nitrate delivery.

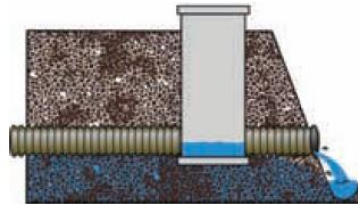


Figure 2. The outlet is lowered a few weeks before planting and harvest to allow the field to drain more fully.

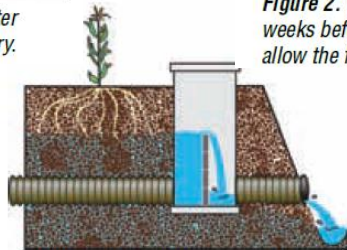
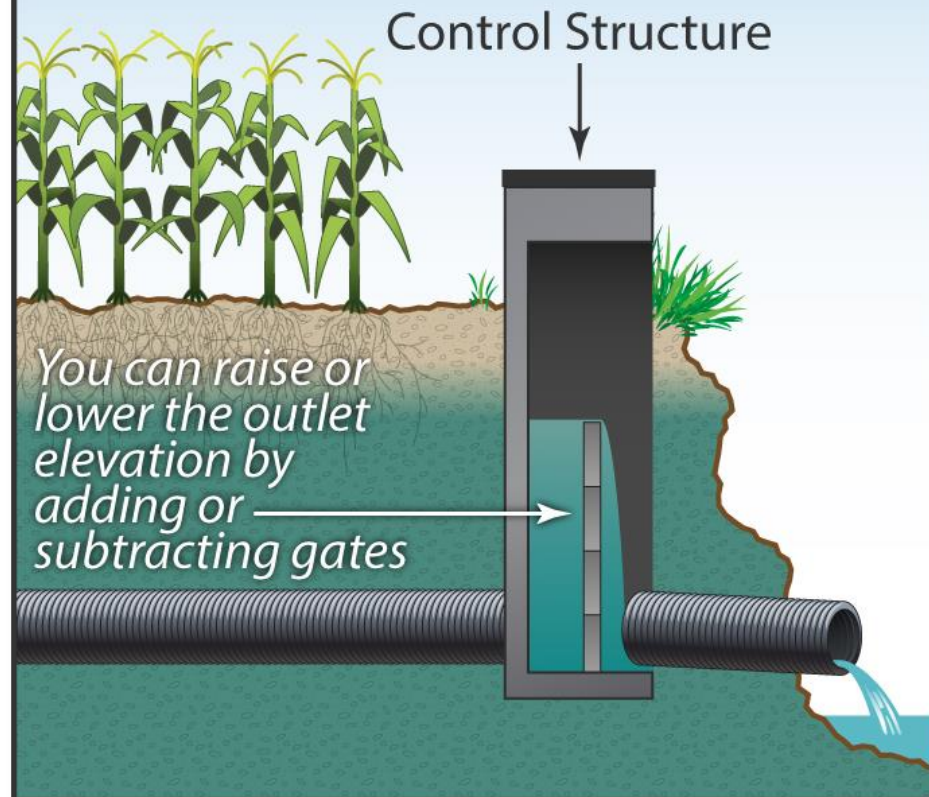


Figure 3. The outlet is raised after planting to potentially store water for crops.

Controlled Drainage



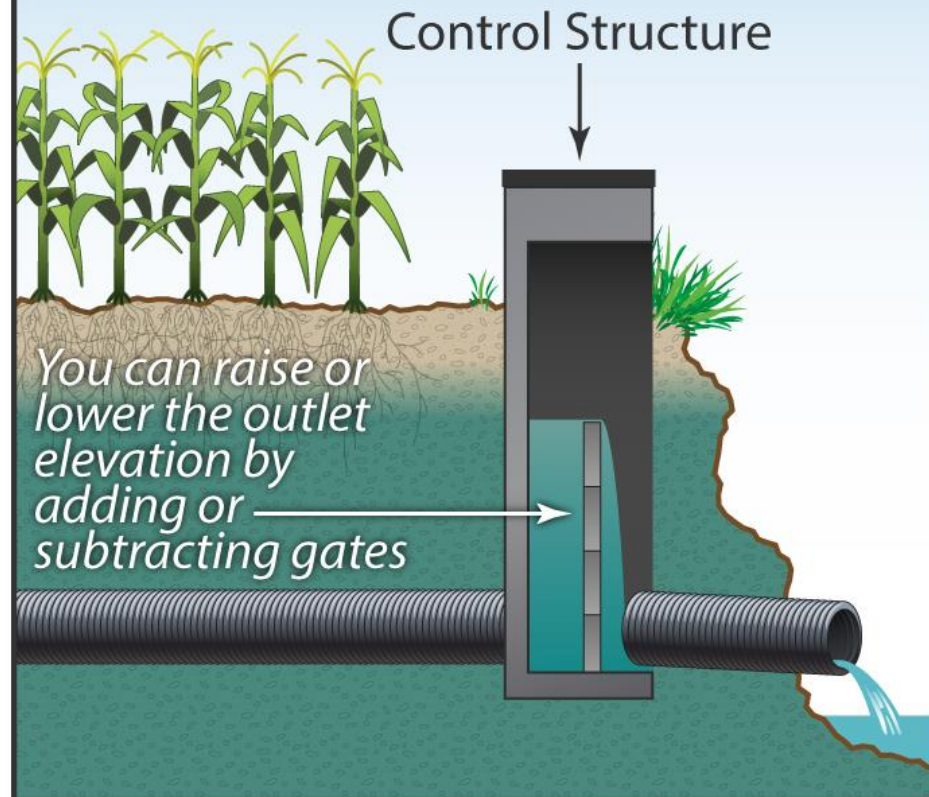
IN-FIELD DRAINAGE SYSTEM PRACTICE: CONTROLLED DRAINAGE

What is it? Adjustable structures

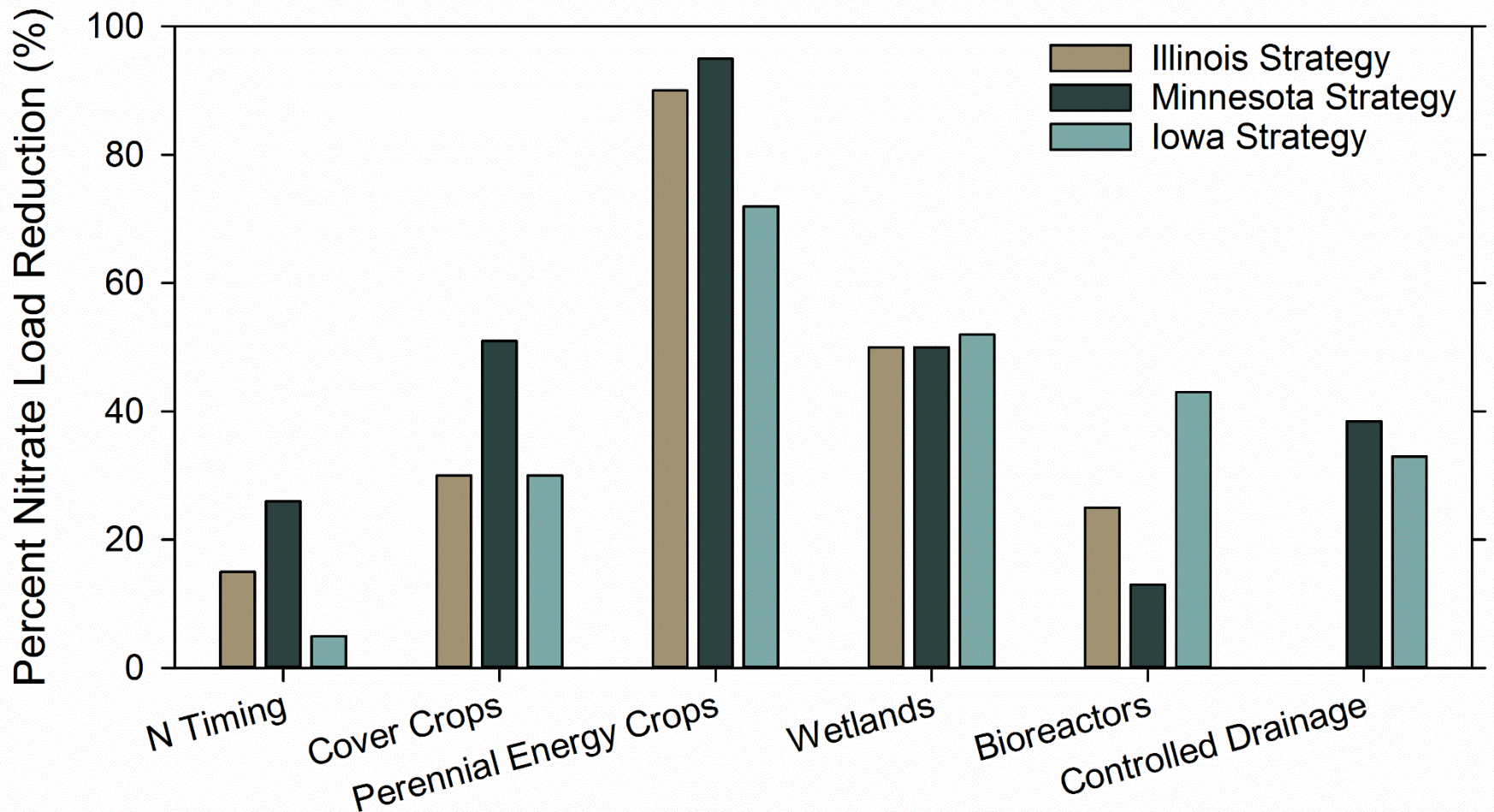
How does it reduce N loss in drainage? Holds back water and nitrate in the water

How effective is it? 30% N reduction (15-75%), but is not in the IL Nutrient Strategy

Controlled Drainage



HOW EFFECTIVE IS IT? STRATEGY COMPARISONS



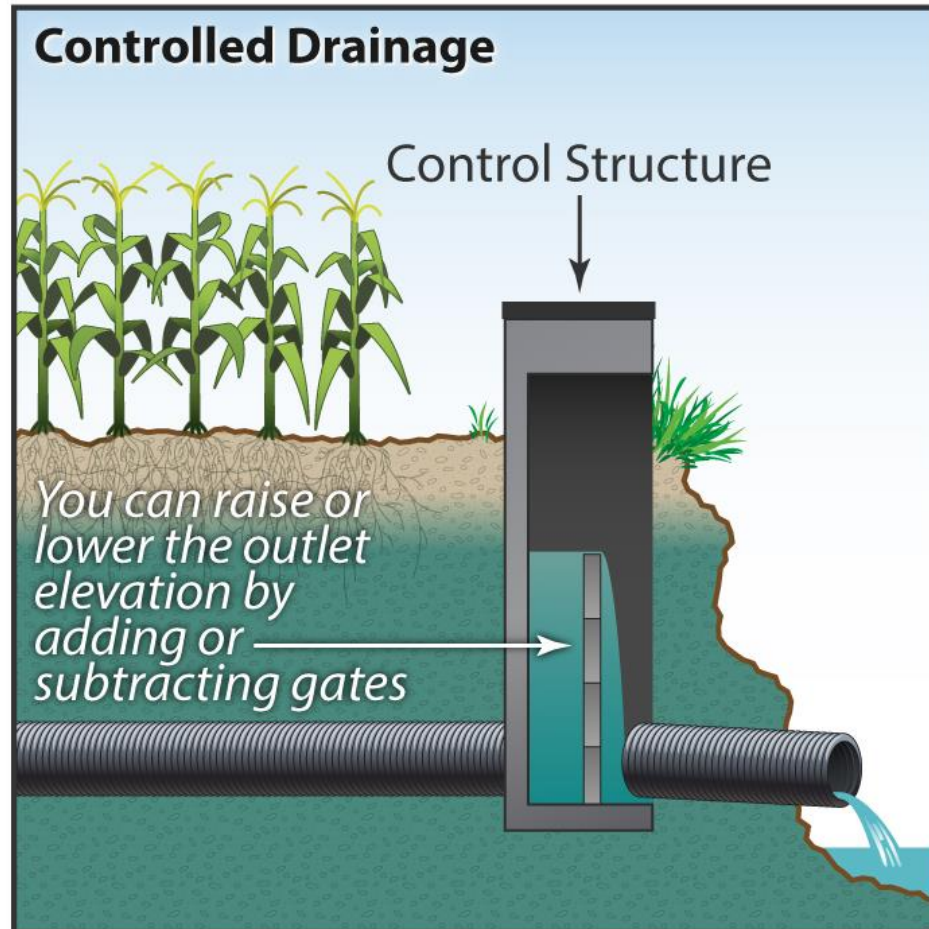
IN-FIELD DRAINAGE SYSTEM PRACTICE: CONTROLLED DRAINAGE

What is it? Adjustable structures

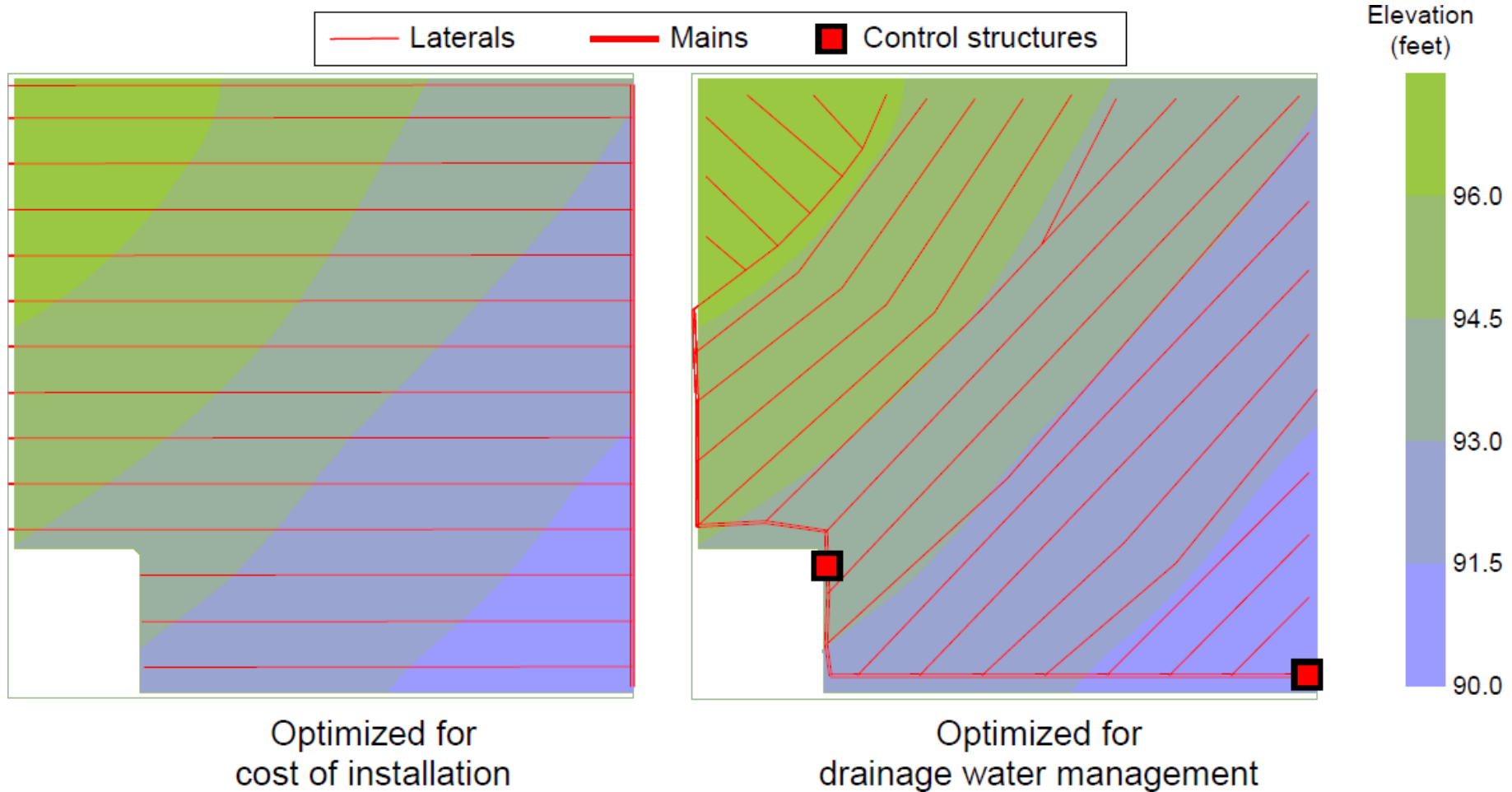
How does it reduce N loss in drainage? Holds back water and nitrate in the water

How effective is it? 30% N reduction (15-75%), but is not in the IL Nutrient Strategy

Where does it work? Most practical on slopes of $<0.5\%$ because more structure are needed with steeper slopes.



WHERE WILL IT WORK?

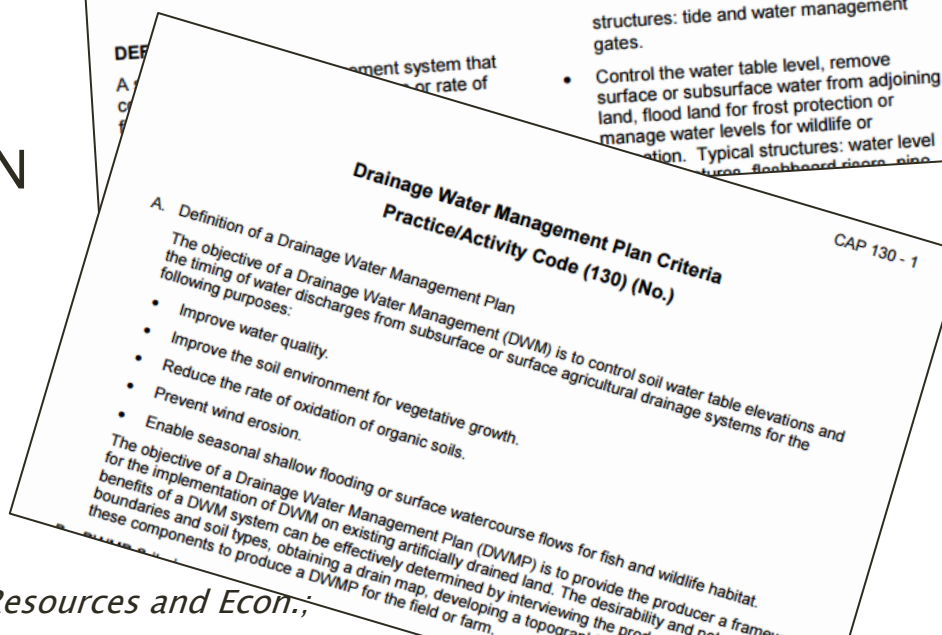
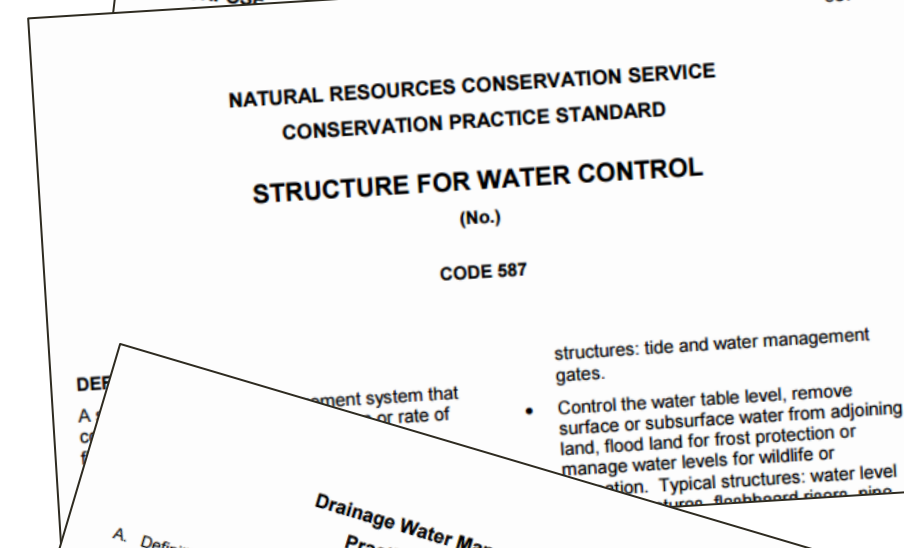
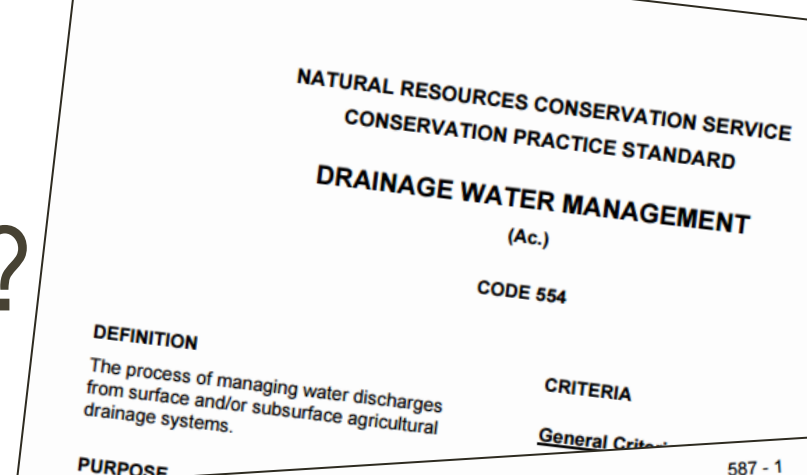


WHAT'S THE COST?

The USDA NRCS may provide incentive payment assistance.

DWM cost efficiency is about a dollar per lb N removed.

- DWM: \$0.37 to \$1.23 per lb N
- Bioreactor: \$1.38 per lb N
- Wetland: \$5.06 per lb N
- Cover crops: \$3.21 per lb N



Sources: IL NRCS; AgriDrain; Christianson et al., 2013 *Water Resources and EcoHydrology*

LIMITATIONS AND RESEARCH GAPS



Where do the nitrate and water that are not lost through the drainage system go? Most likely the water ends up in deep or lateral seepage and the nitrate may be denitrified, but the extent of these processes are not known.

To what extent does this practice increase surface runoff?

What are crop responses to controlled drainage?

Are there negative impacts? Increased loss of dissolved phosphorus?

WHAT'S NEXT?

WHAT'S YOUR STRATEGY?

The Illinois Nutrient Loss Reduction Strategy: Illinois farmers across the state share their conservation stories

BMPs > Partners > About > [Calendar](#)

Bioreactors
s Tile and No-Till on

Buffer

Cover Crops

Drainage
Water
Management

Nutrient
Management
(4Rs)

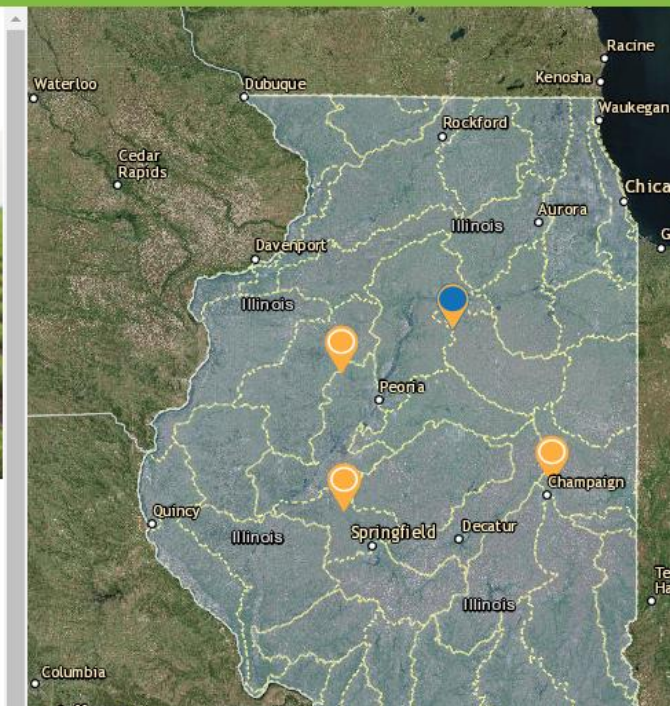
Farmer/Landowner: Jim Martin

Location: Wenona, IL

Organizations Involved: Illinois Soybean
Association

Best Management Practice(s):

- [Drainage Water Management \(control structure at end of tile\)](#)



Laura Christianson

@IL_DrainDrop

The Christianson Drainage Research and Outreach Program at the University of Illinois (I-DROP) is all about practical solutions to improve ag. water quality.

