

Improving Ecosystem Services From Agricultural Lands

Opportunities for Drainage Water Management
to Deliver Improved Ecosystem Services

More Quantifiable

Lower Costs

Better Meet Market Requirements



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Multiple Ecosystem Services Are DEPENDANT on Private Lands

1. Water – 80% of Precipitation in Continental US Falls on Private Lands
2. Wildlife – vast majority of wildlife have habitat on private lands
3. Endangered Species – 80% of listed species have Critical Habitat on private lands
4. Multiple other ES come from private lands – ie CO²-e, flood reduction, & FOOD



Increasing Demands on Agriculture

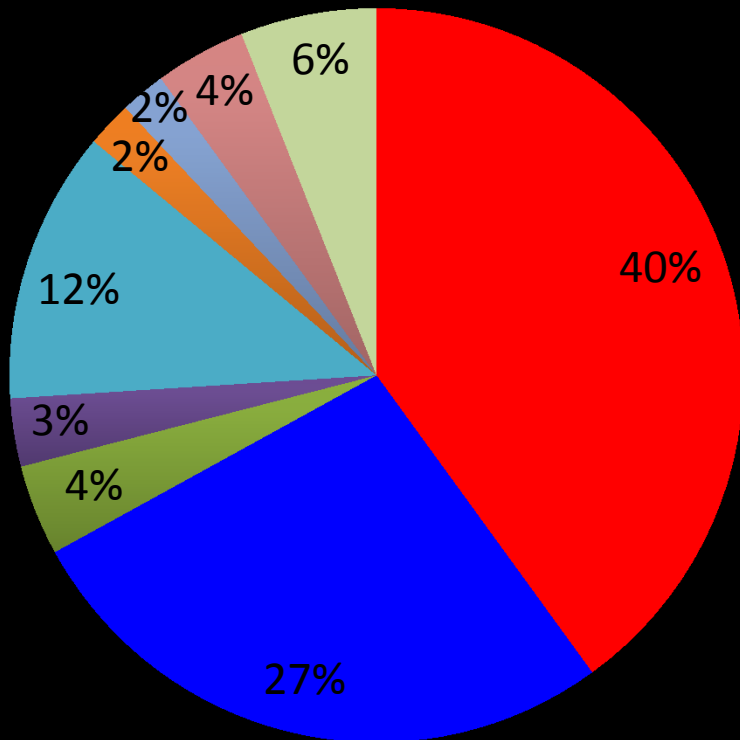
- Food
 - World Population projected between 9 and 12 billion by 2050
 - 30% increase in protein per capita (World Wide!)
 - Need as much food in next 50 years as in the history of agriculture
- Fuel – Conversion to fuel uses almost as much US corn as is used for animal feed. It exceeds usage for export, food and seed combined
- Declining land basis



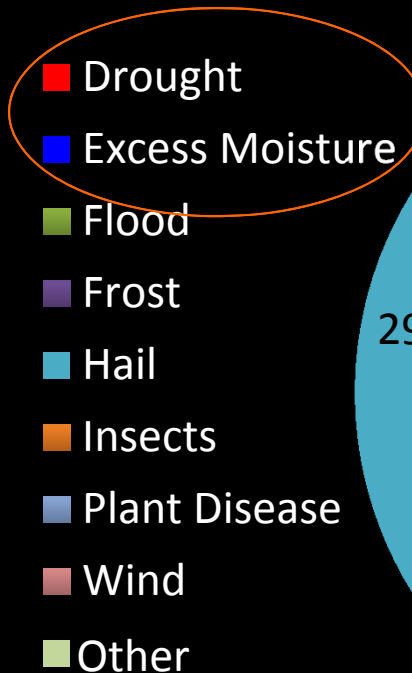
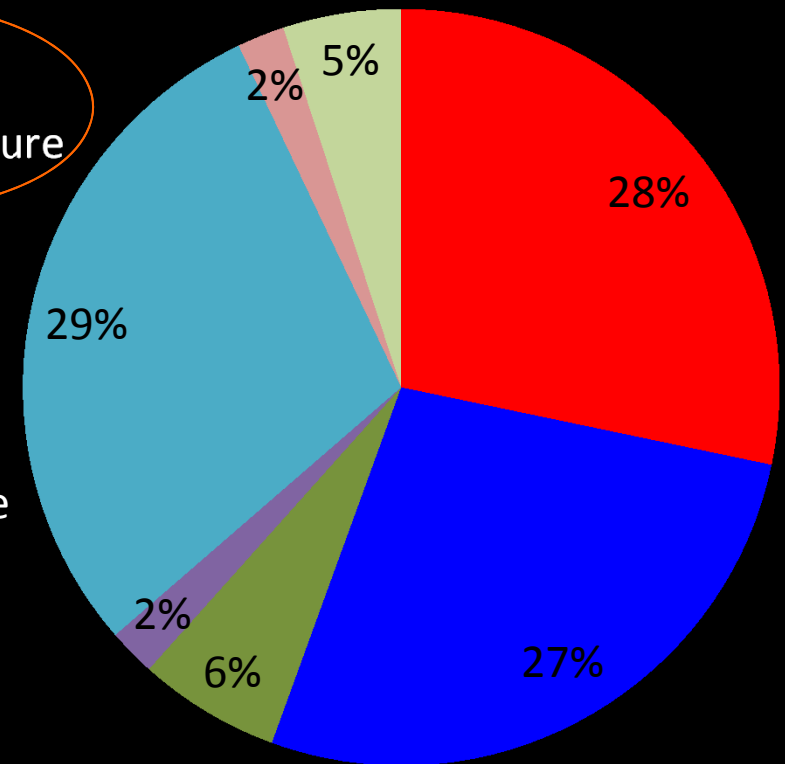
Improving Agricultural Production

Causes of Crop Loss Iowa

Corn 1948-2010



Soy 1955 - 2010



Data courtesy of Chad Hart, Managing Risk in Agriculture, Iowa State University, June 2013

Massive Intensification of Ecosystem Services From Ag Lands Needed

- Ag production will continue to increase to meet food and fuel demands
- Land base will continue to decline
- We need more ecosystem services produced on a smaller and more highly managed land base
- We need to build systems to encourage more not less ecosystem production in a competitive environment

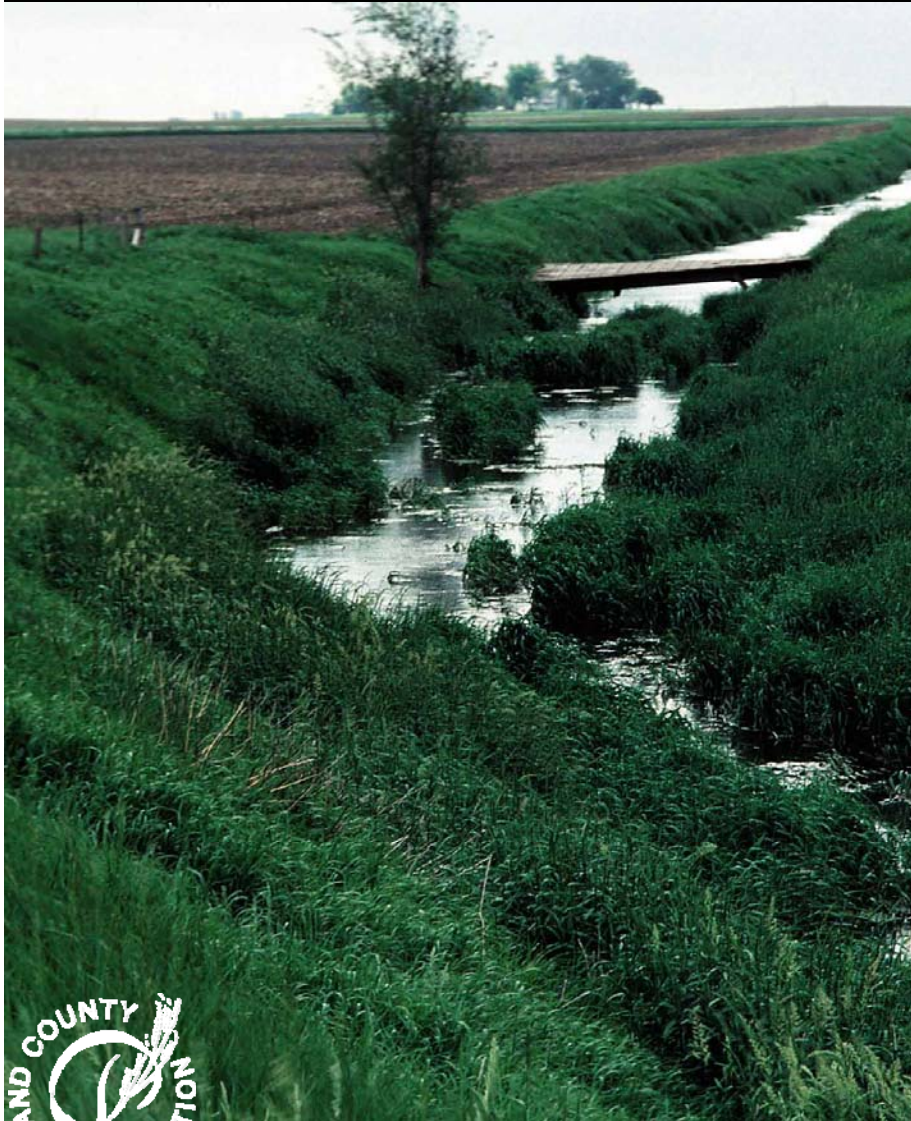


Environmental Outcomes

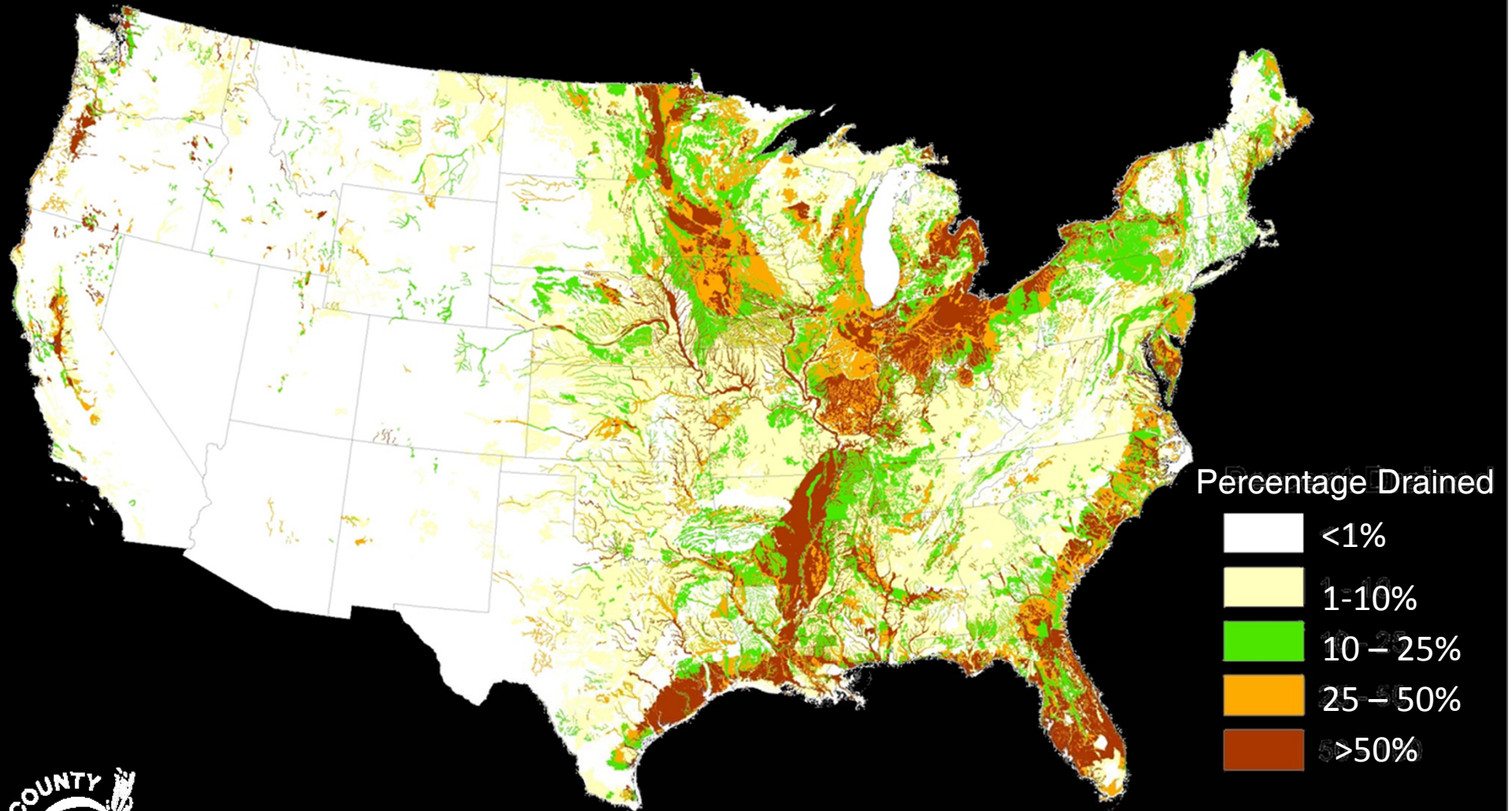
Lake Erie (The World Has Changed?)



How Water Moves Off Ag Lands



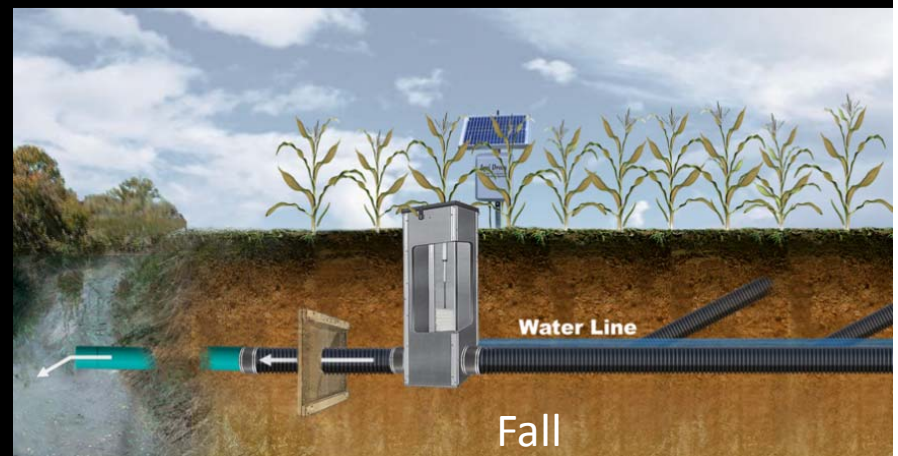
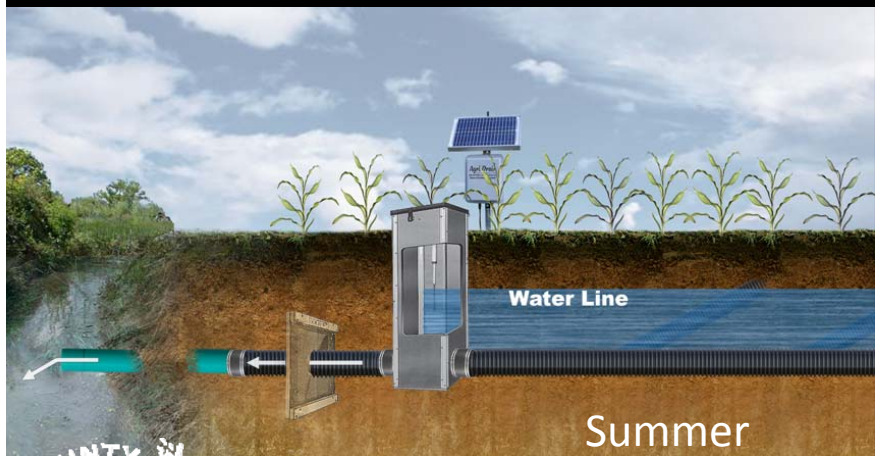
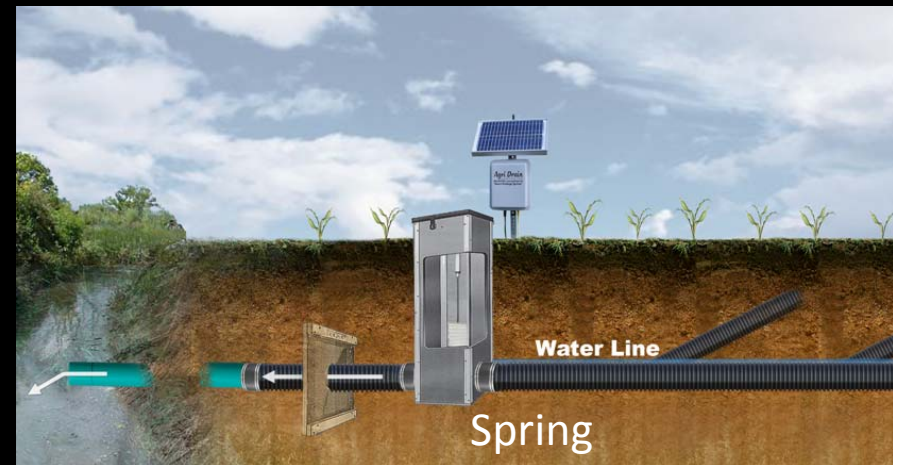
Agricultural Drainage



(Jaynes and James 2008)

Drainage Water Management

TILE LINE MANAGEMENT (practice 1)

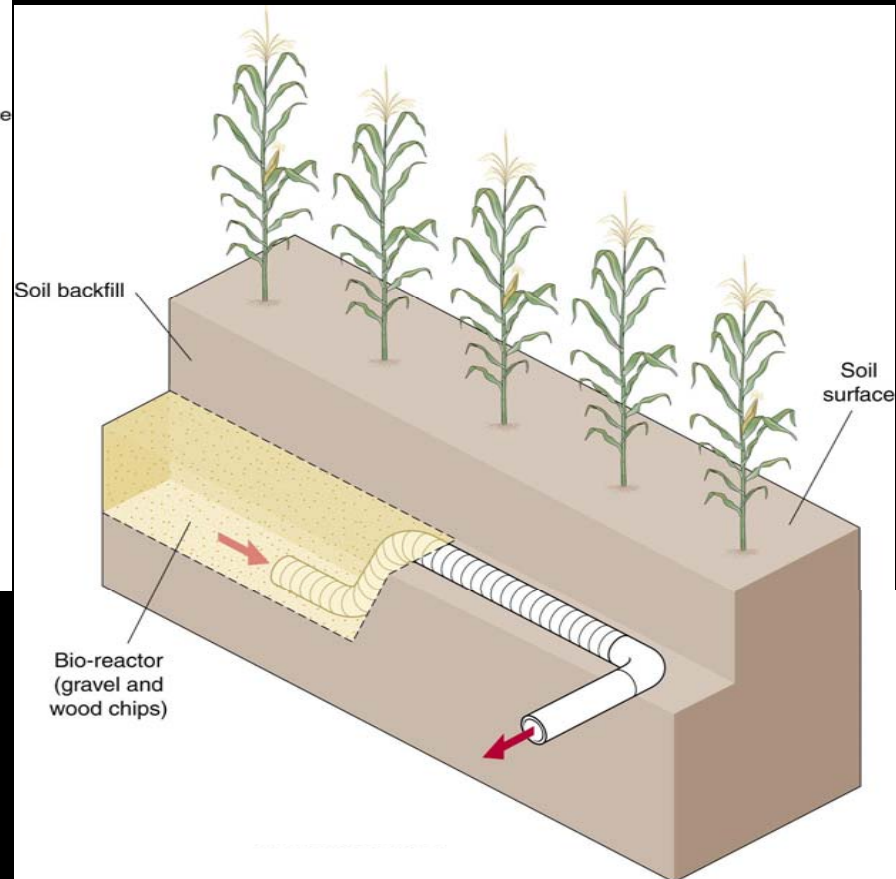
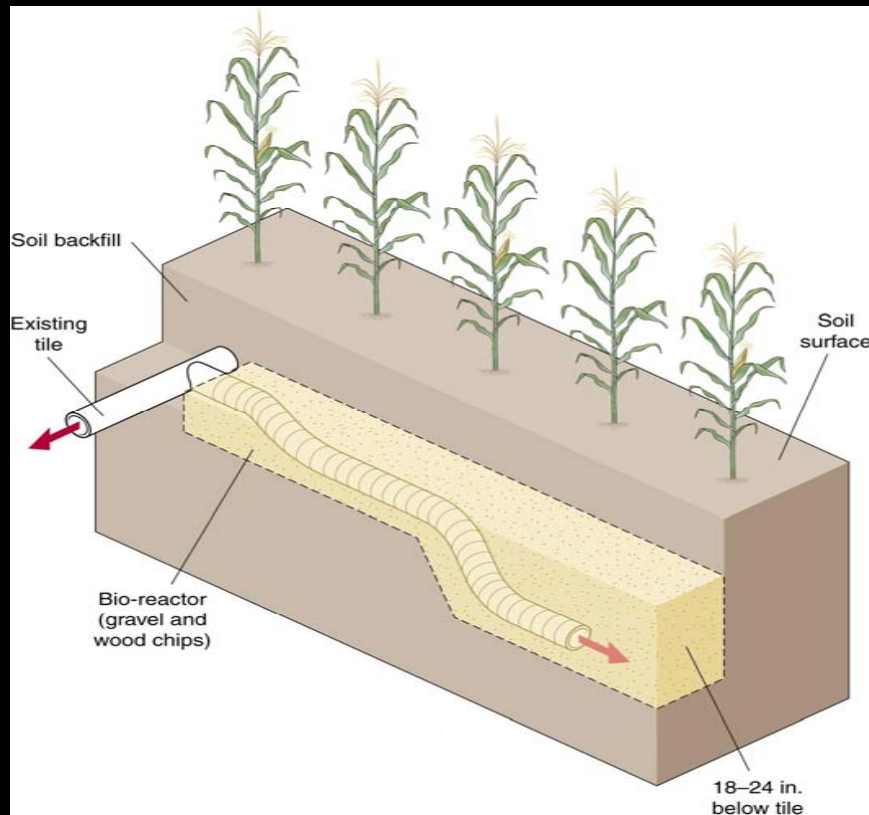


Fully Instrumented/Automated

Control
Measure
Report



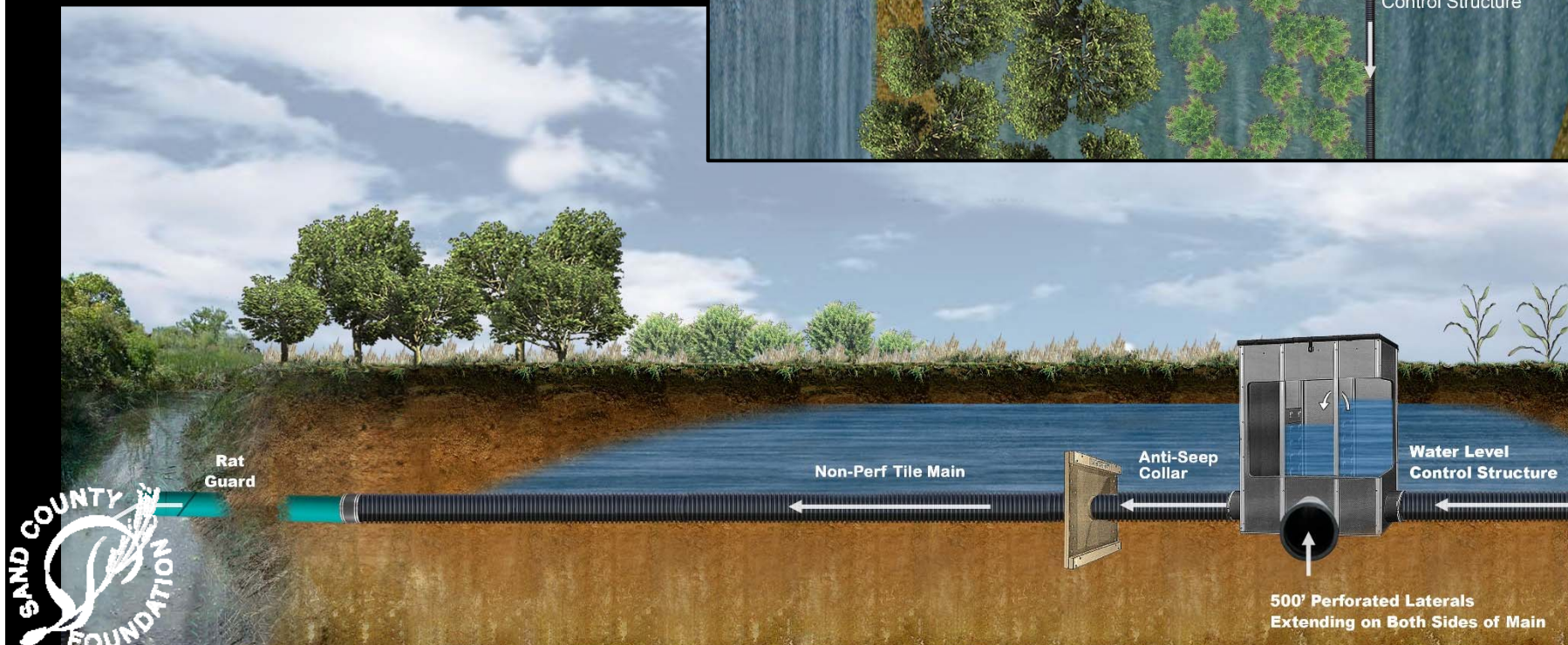
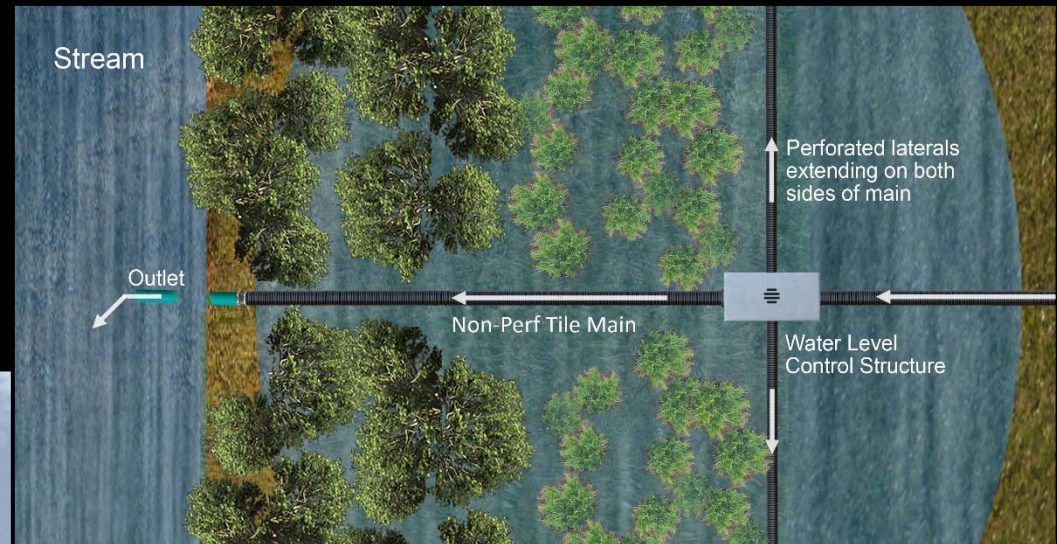
Drainage Water Management BIOREACTOR (practice 2)



Bioreactor



Drainage Water Management SATURATED BUFFER (practice 3)



Advantage Of DWM, Bioreactors, Saturated Buffers, To Advance Markets

1. Each practice performance highly reliable
2. Each practice performance highly quantifiable
3. Each practice performance easily 3rd party certified
4. Each practice a capital investment that will operate for years
5. Cost – out performs other nutrient strategies

