NRCS issues and research needs: ARS National Program 211 – Water availability and watershed management, 2015

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USDA

Natural Resources Conservation Service

EQIP Funding Provided for Irrigation Practices Nationwide During FY 2011				
Conservation Practice	Code	Contracted Items	Federal Payments	Rank by Obligation
Irrigation System, Sprinkler	442	2777	$64,586,626	3
Irrigation System, Microirrigation	441	1803	$41,817,291	6
Irrigation Pipeline	430	3984	$46,630,646	8
Pumping Plant	533	4146	$23,029,712	12
Irrigation Land Leveling	464	1036	$14,630,646	24
Irrigation Reservoir	436	253	$12,267,205	26
Irrigation Water Management	449	5136	$5,813,535	41
Total Obligation for these 7 practices	-	19135	$208,775,661	-
National 2011 Total ALL Practice Obligations	-	196206	$1,035,674,657	-
Percent of National 2011 Total	-	10%	20%	-

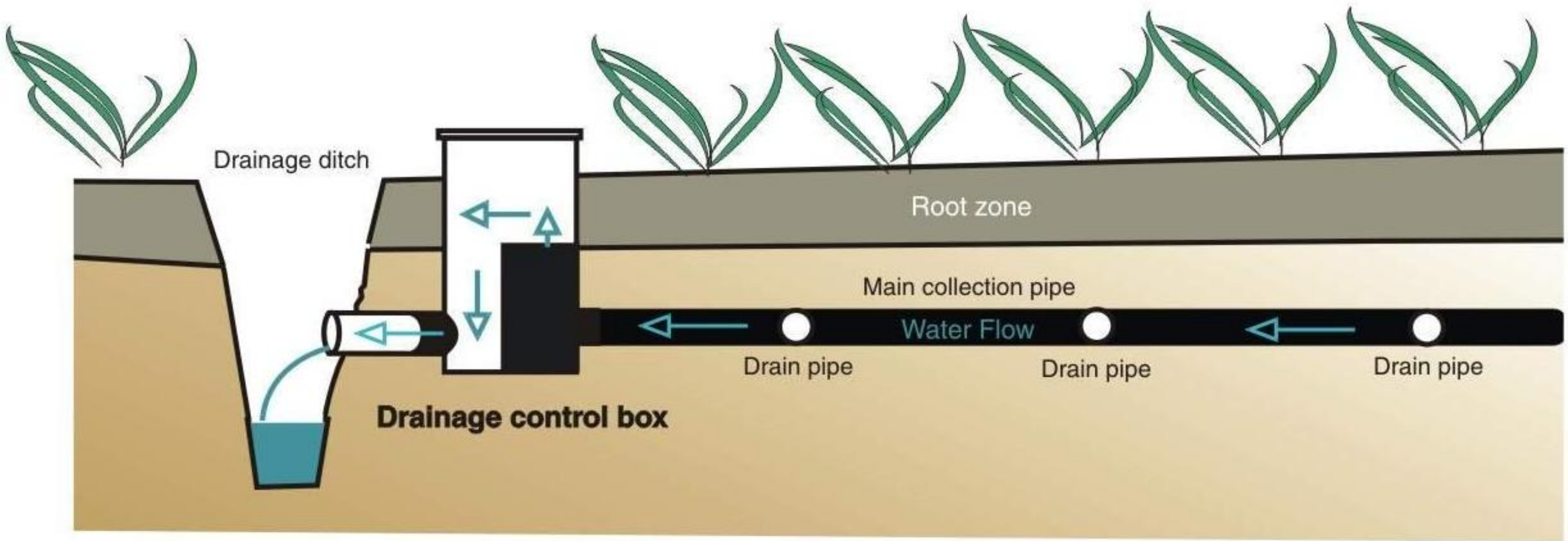
Irrigation Water Management

Micro Irrigation

Need #1- Refining Irrigation Science

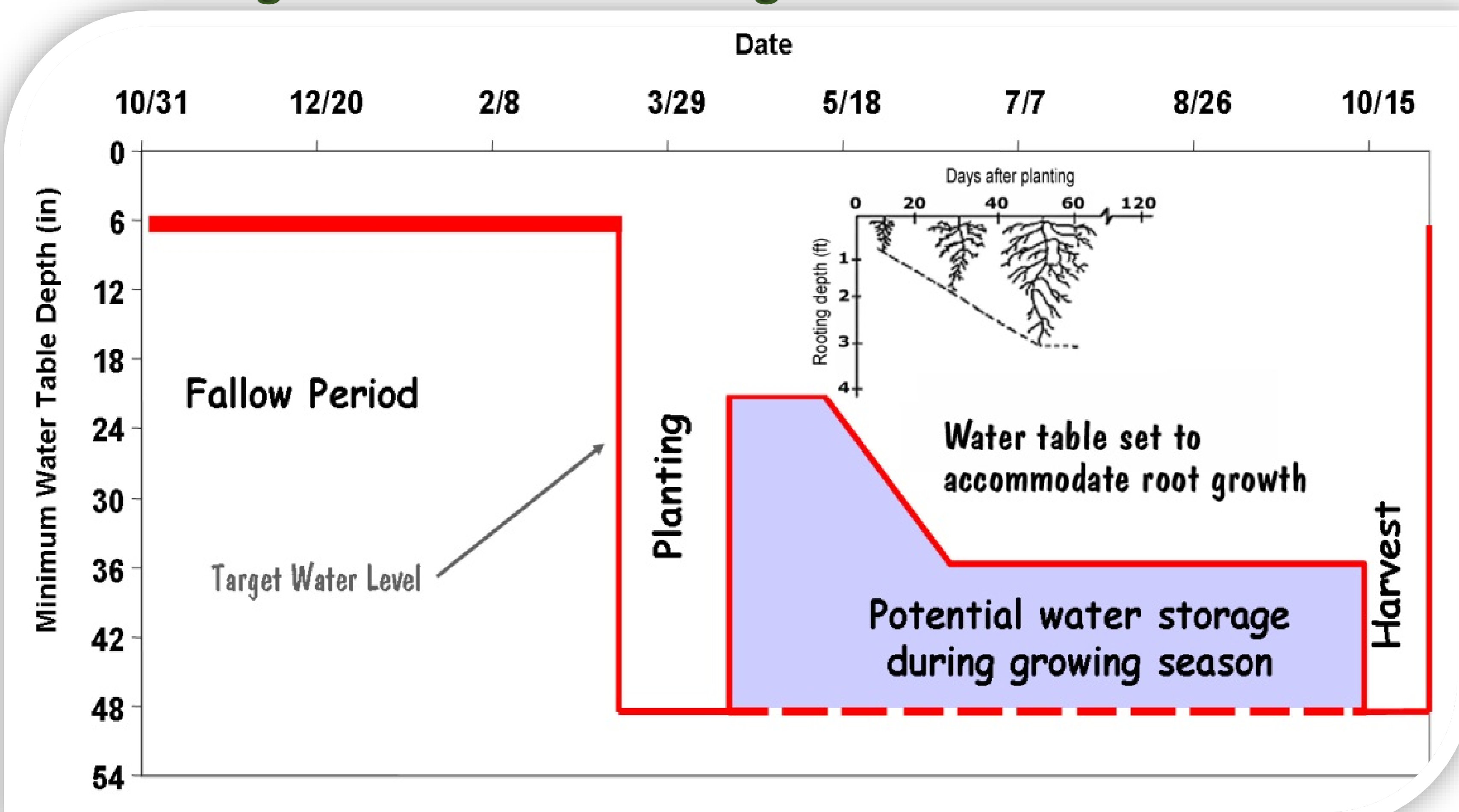
- Detecting and verifying real changes in CU at the field and multi-field scale
- Deficit irrigation and optimal yield/profit (multi-year time frames)
- Irrigation ‘insurance’ in humid climates with (possibly) increasing climate variability
- Irrigation and soil health
  - Water holding capacity
  - Surface infiltration rates

Drainage Water Management and water reuse 'subsurface'



Drainage Water Management is the process of managing timing and amount of water discharges from agricultural drainage systems. The DWM plan provides the target water table level settings needed at specific dates or seasons.

Target Water Level Settings to Minimize Tile Flows



Saturated Outlets

- Less data than bioreactors. What we know right now:
  - They are very effective
  - Currently do not seem to be sensitive to width or slope. As always: wider is better. Flatter is better.
  - Accept the interim standard for National posting???
  - MORE design parameters?

NATURAL RESOURCES CONSERVATION SERVICE
INTERIM CONSERVATION PRACTICE STANDARD

VEGETATED SUBSURFACE DRAIN OUTLET

(Ft.)

CODE 739

DEFINITION

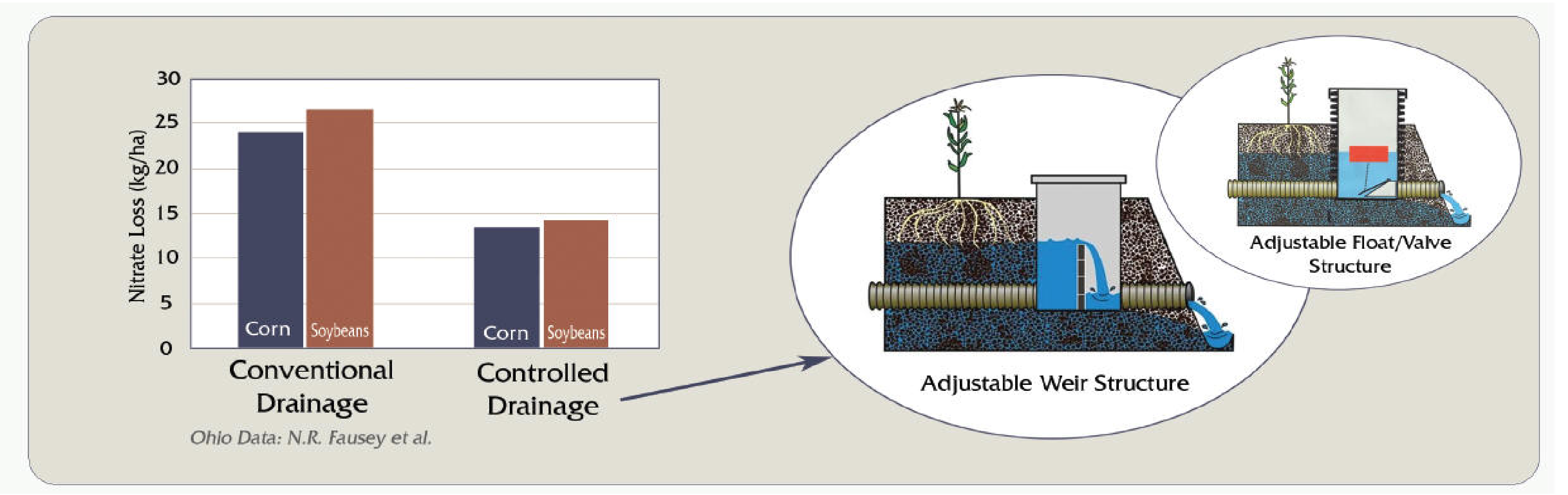
A water control structure and subsurface distribution pipe capable of diverting drainage system discharge to create an elevated zone of

CRITERIA

General Criteria Applicable to All Purposes

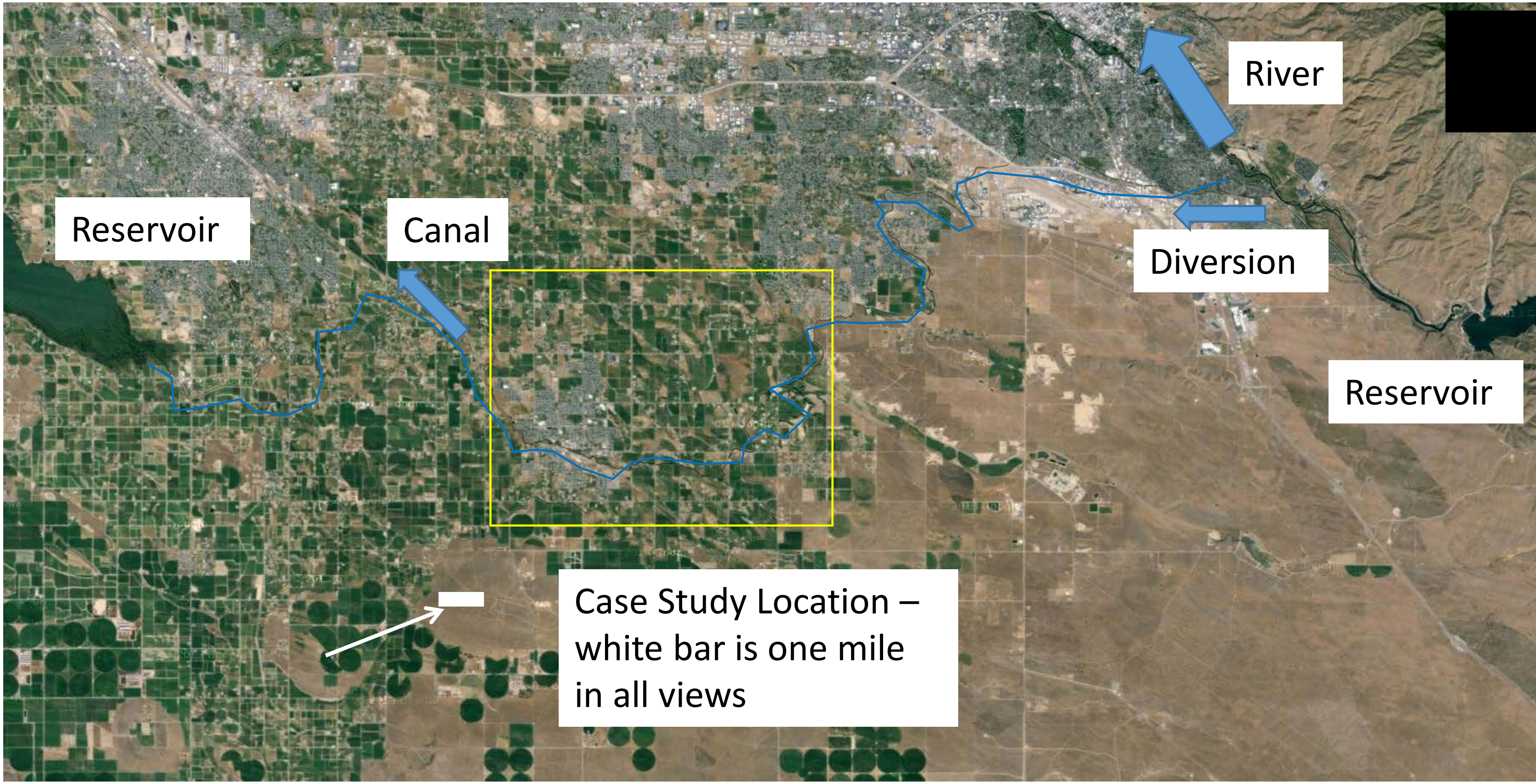
Geologic and soil investigations shall be

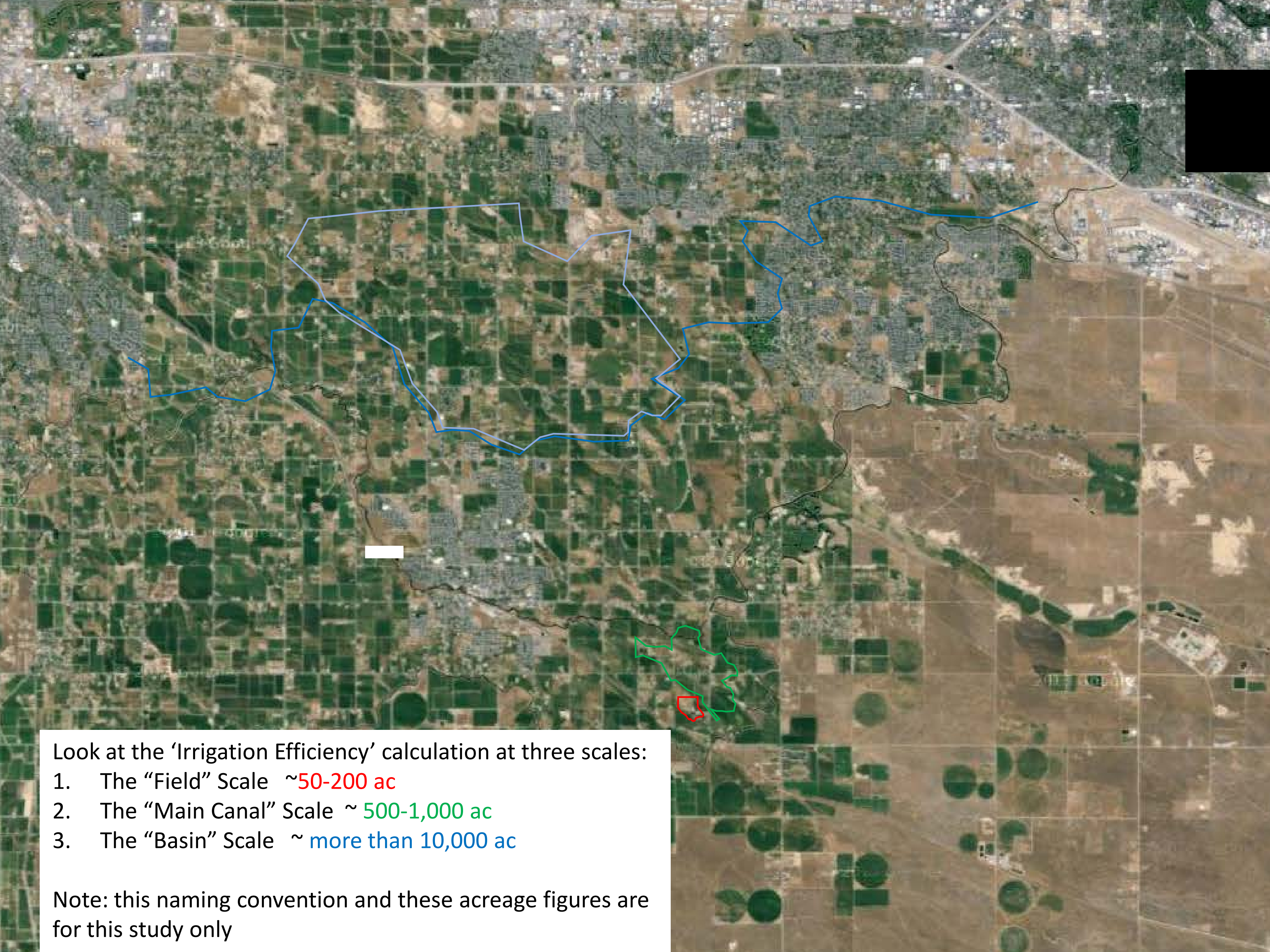
Drainage Nutrient Load Reduction



Need #2- Refining Conservation Drainage Science

- Subsurface Irrigation ‘insurance’ in humid climates with (possibly) increasing climate variability
- Use EOF monitoring results to refine DWM suite of practices
- Conservation drainage and soil health
  - Optimal saturation times and depths
  - Possible schemes to use water table control to optimize cover crop nutrient scavenging
- Water quality inlets
- Rates of adoption

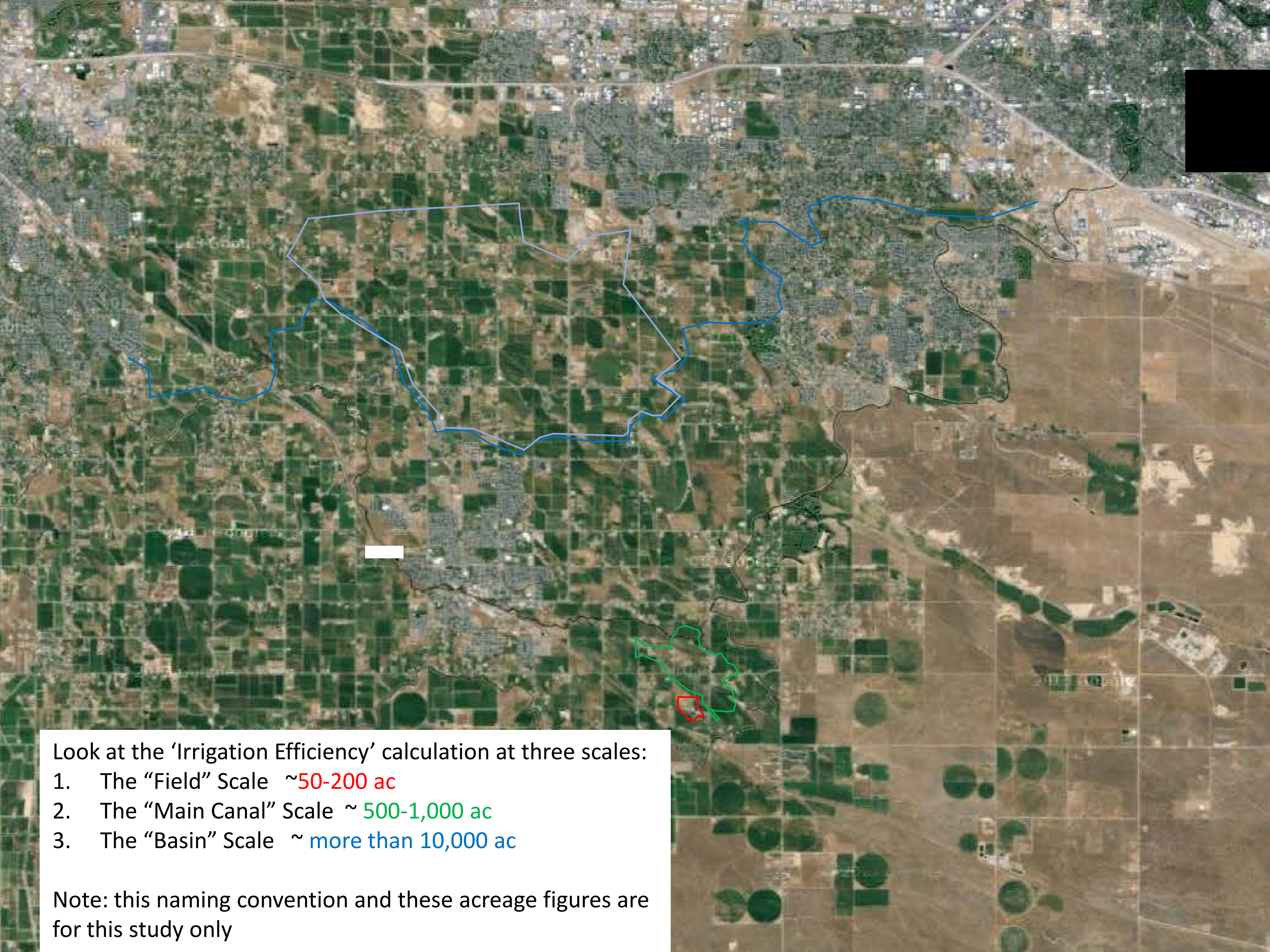

River
Reservoir
Canal
Diversion
Reservoir
Case Study Location –
white bar is one mile
in all views



Look at the ‘Irrigation Efficiency’ calculation at three scales:

1. The “Field” Scale ~50-200 ac
2. The “Main Canal” Scale ~ 500-1,000 ac
3. The “Basin” Scale ~ more than 10,000 ac

Note: this naming convention and these acreage figures are for this study only



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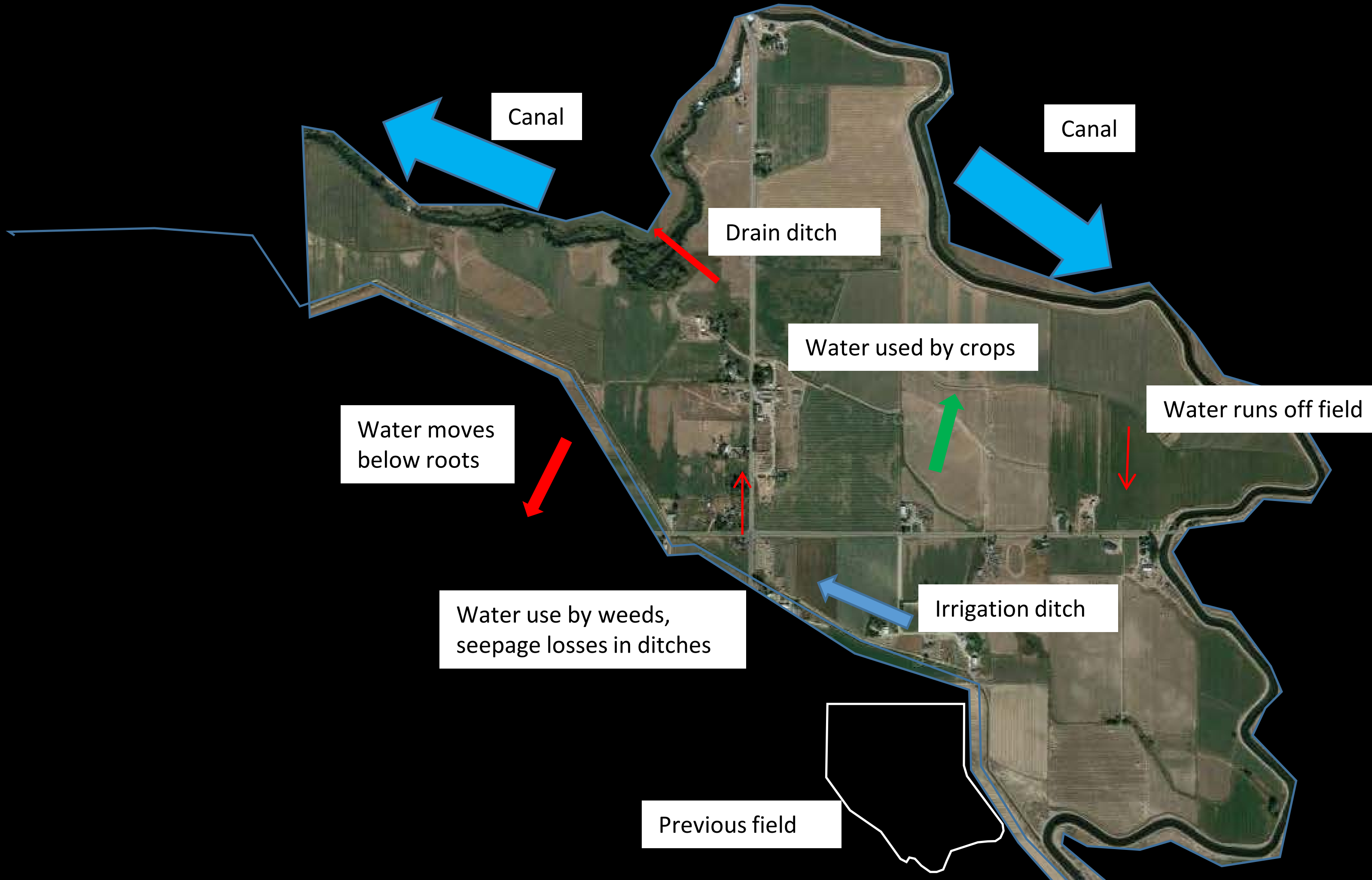


So what changed by looking at a bigger area? We have the same basic components as the previous field.

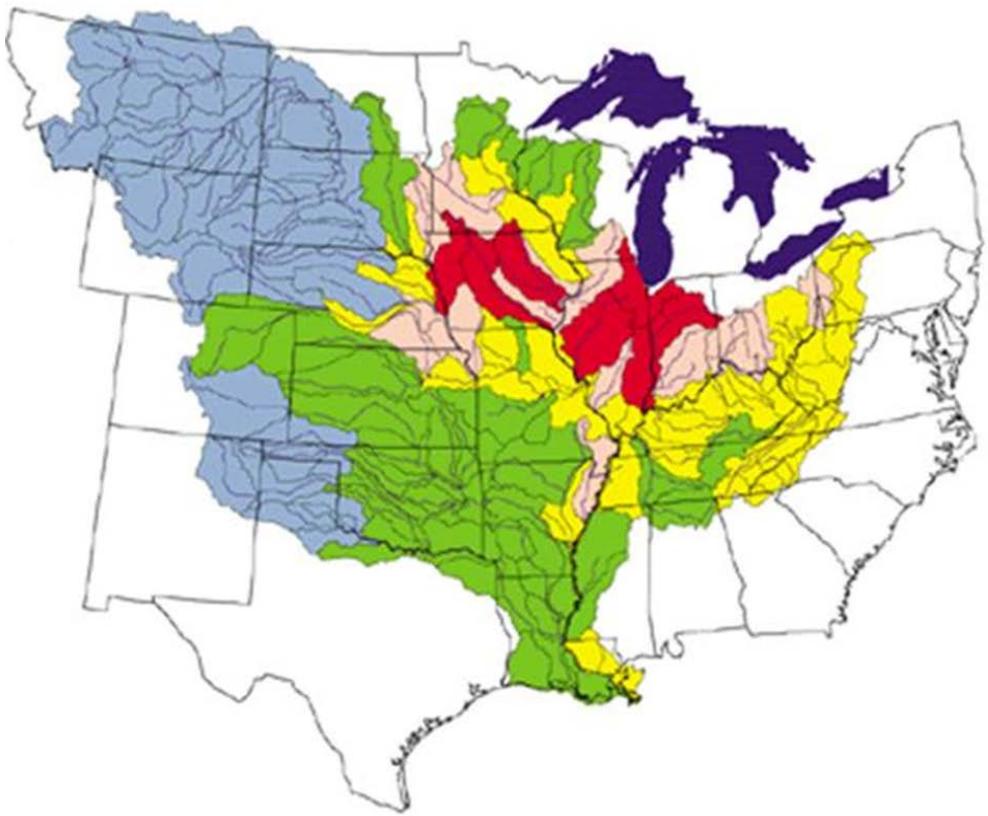
Mississippi River Basin

Average Annual Nitrogen Load in Streams

N Load, lbs/acre

- Less than 1.8
- 1.8 to 4.4
- 4.5 to 8.9
- 9.0 to 16.0
- 16.1 to 27.1

Watershed Average = 2.6 lbs/acre



Need #3 - Scaling up and transferring effects

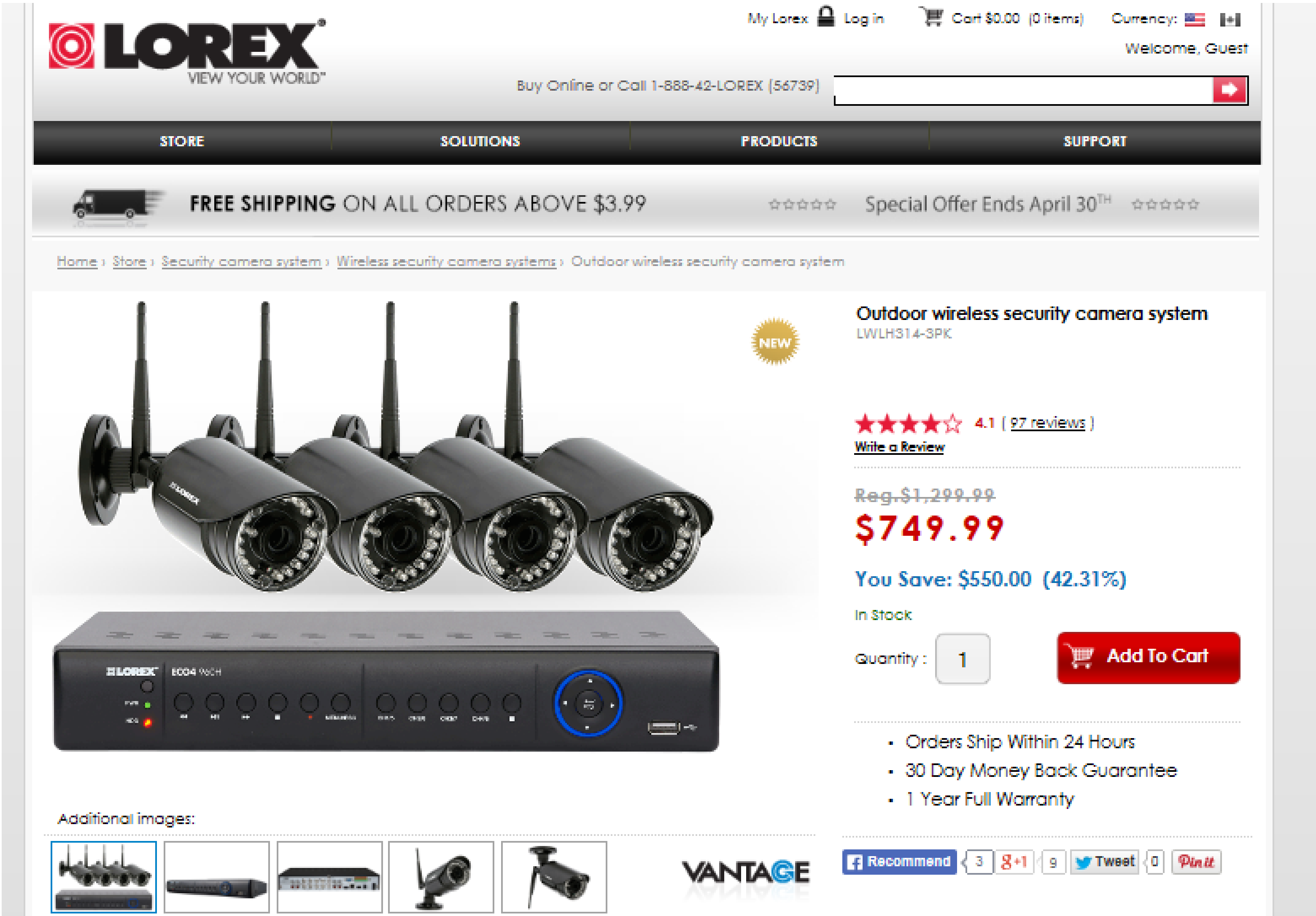
- Conservation drainage and sub-basin, in-soil water storage
- Aquifer overdraft amelioration
- Soluble phosphorus fate and treatments
- Treatment of phosphorus overloaded basins
- Aggregating EOF monitoring results

Need #4 – Better Tools

In-field and in-drainage way sensors.

Prediction models for water supply in areas where snow pack variability is increasing (California fire season > 70 days since 2000).

Use of 'reclaimed' (grey, storm, brackish) water for irrigation supply.



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