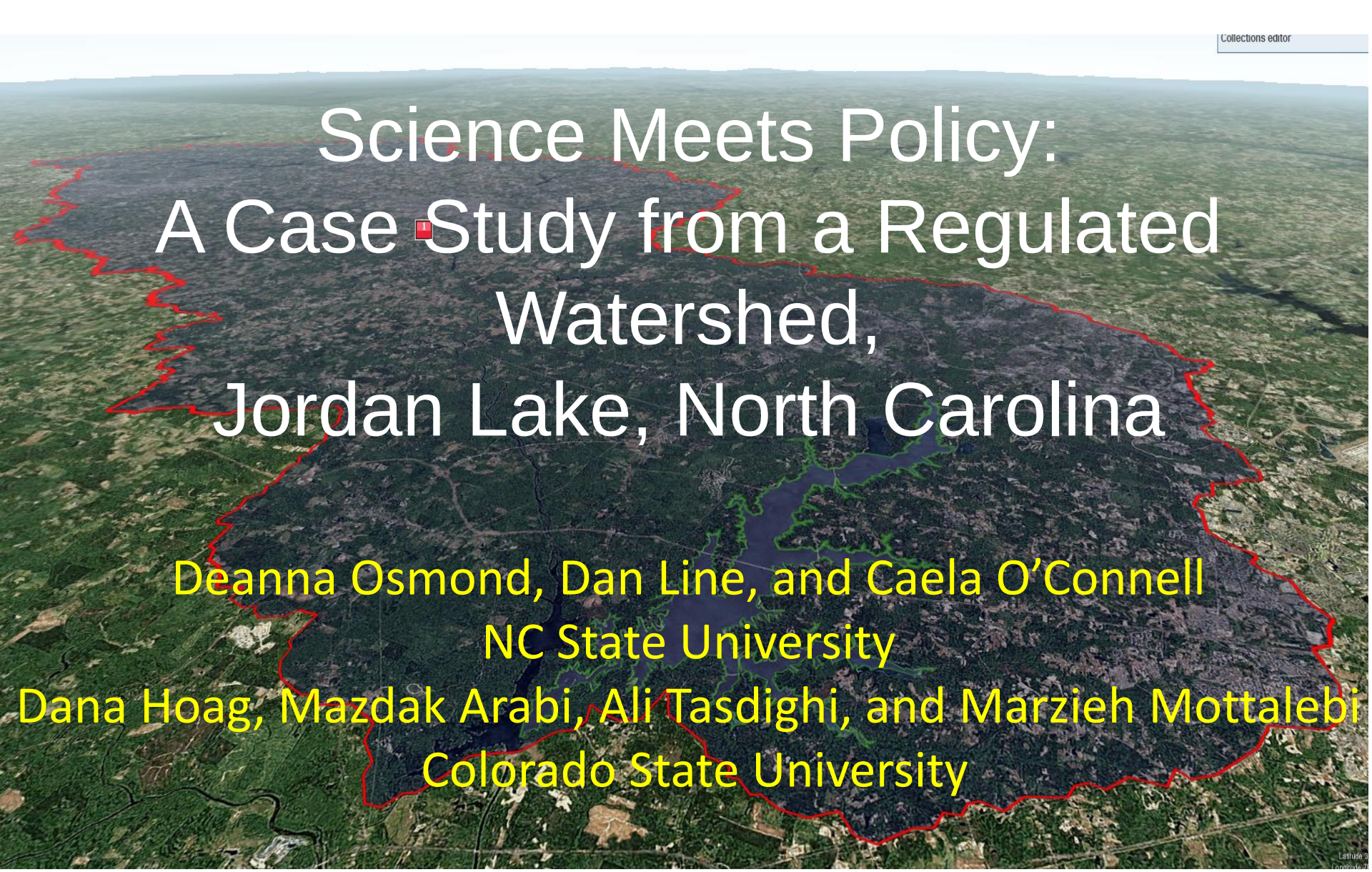

Science Meets Policy: A Case Study from a Regulated Watershed, Jordan Lake, North Carolina

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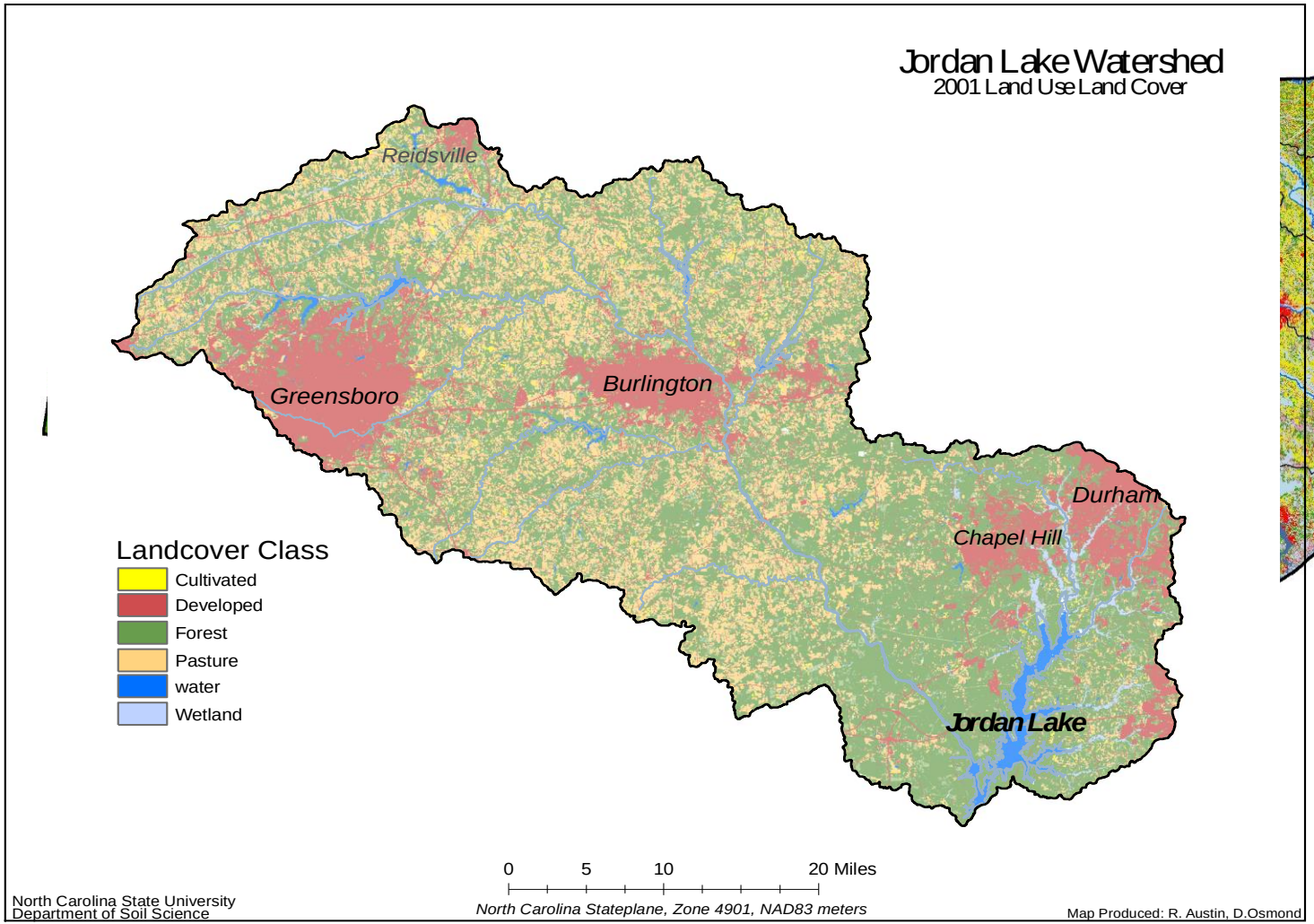
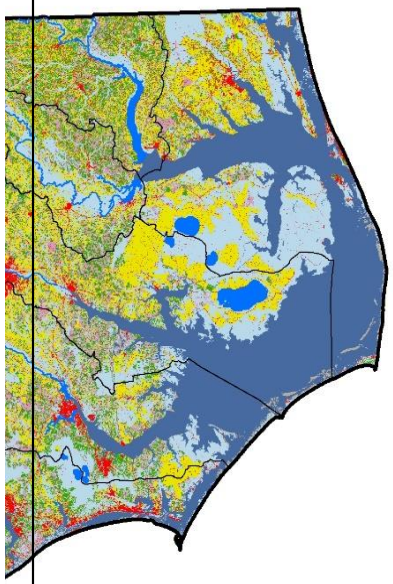
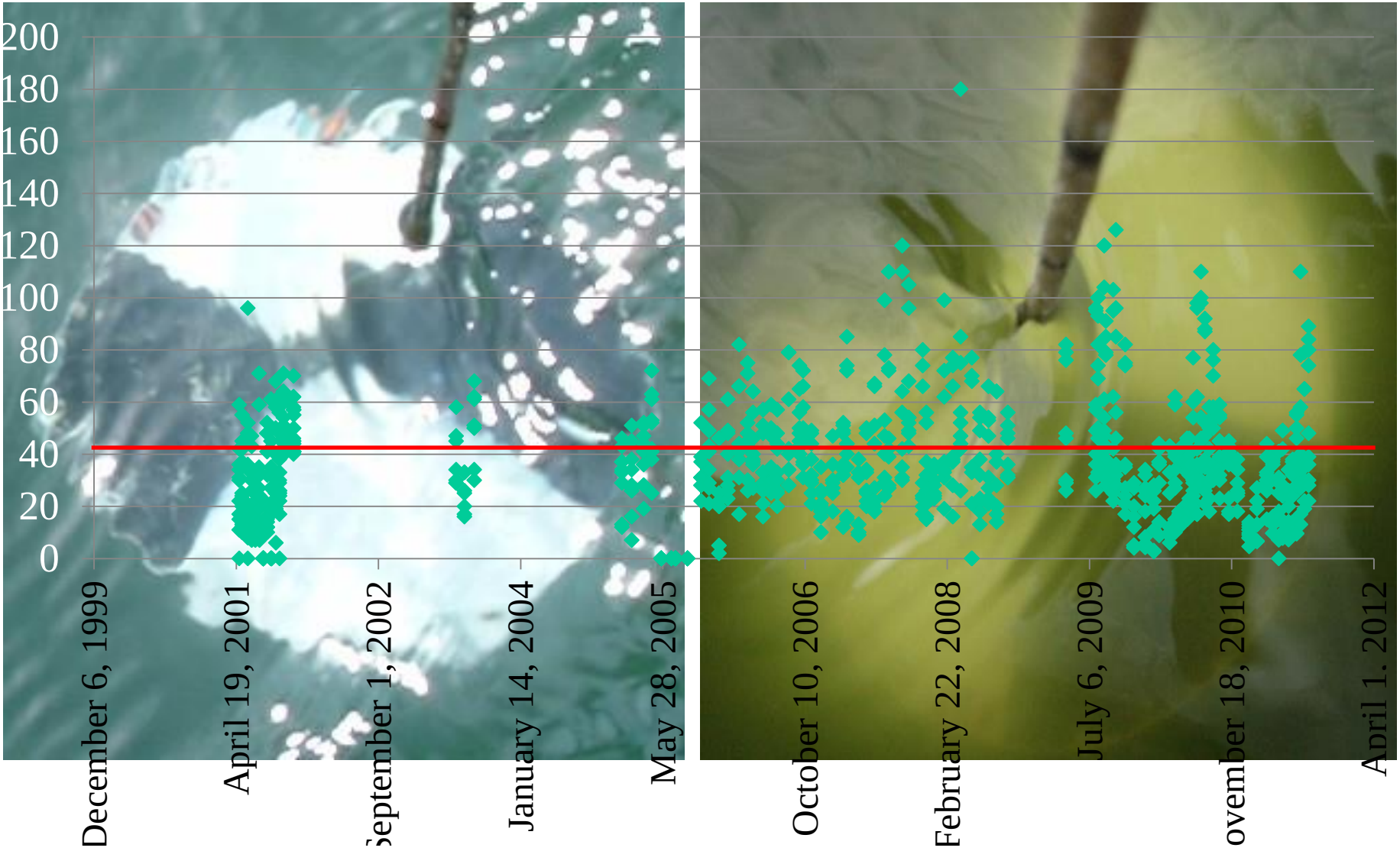
LAND USE AND WATER QUALITY:
Agricultural Production and the Environment
Vienna, Austria, 21-24 September 2015

North Carolina River Basins and Land Use (2011)





Jordan Lake Water Quality: The Problem

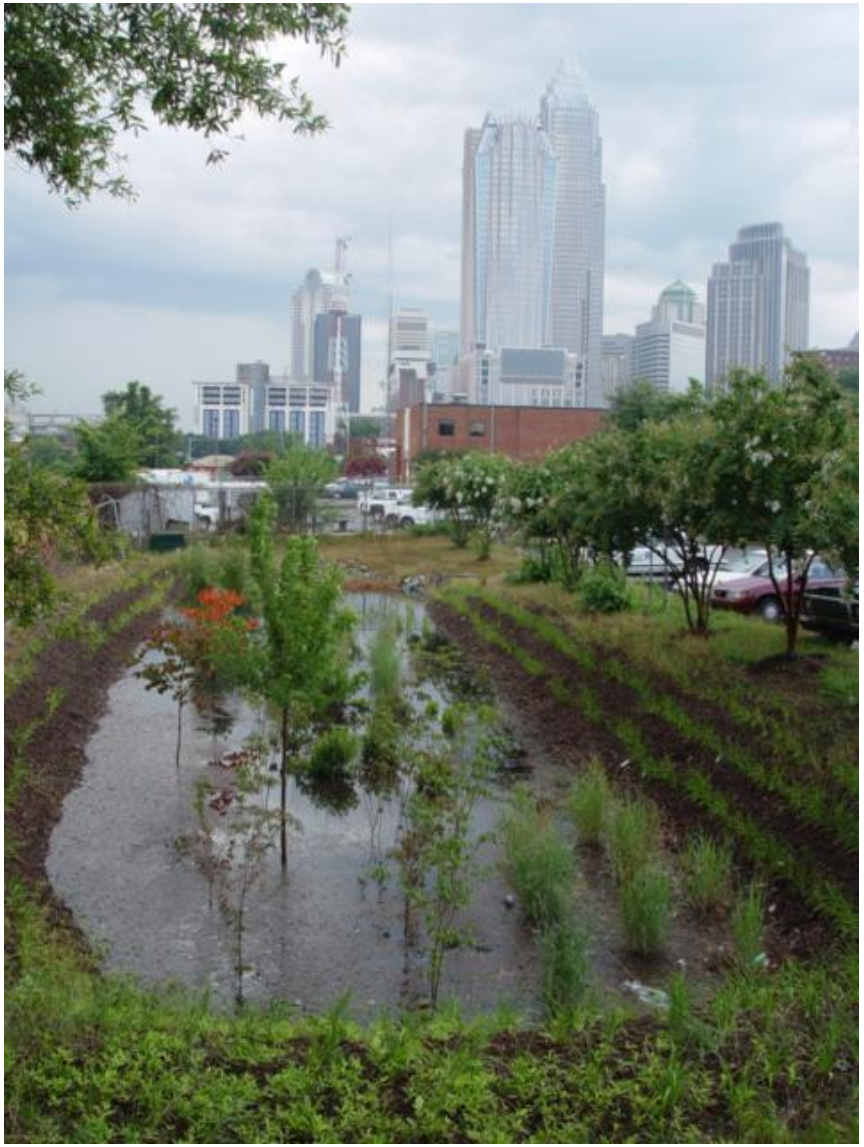


Jordan Lake Regulations: The Solution

Nutrient Load Reductions required by state of North Carolina from the 1997-2001 baseline period

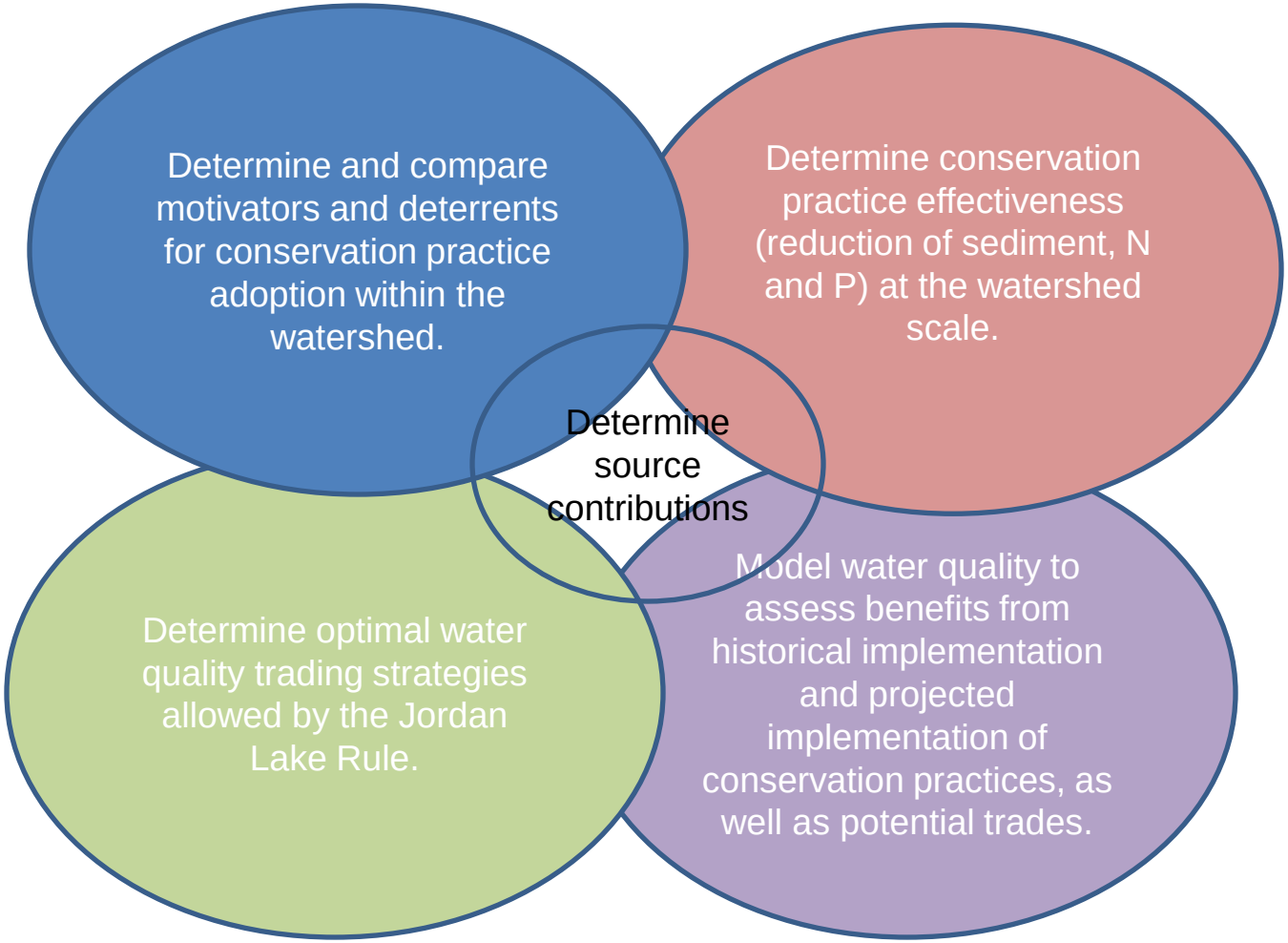
- Upper New Hope Sub Basin: 35% N & 5% P
- Lower New Hope Sub Basin: 0% N & 0% P
- Haw Sub Basin: 8% N & 5% P

Nutrient Reductions Required By All Sources

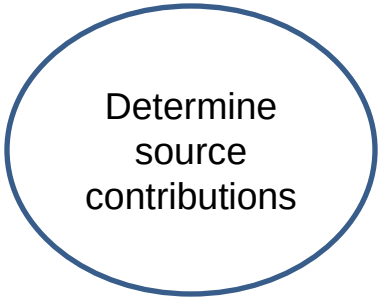


The goal of *Analysis of Conservation Practice Effectiveness and Producer Adoption Behavior in the Jordan Lake Watershed (North Carolina)* is to add to the conservation effects knowledge base of watershed-scale impacts of conservation practices on water resources and producer behavior.

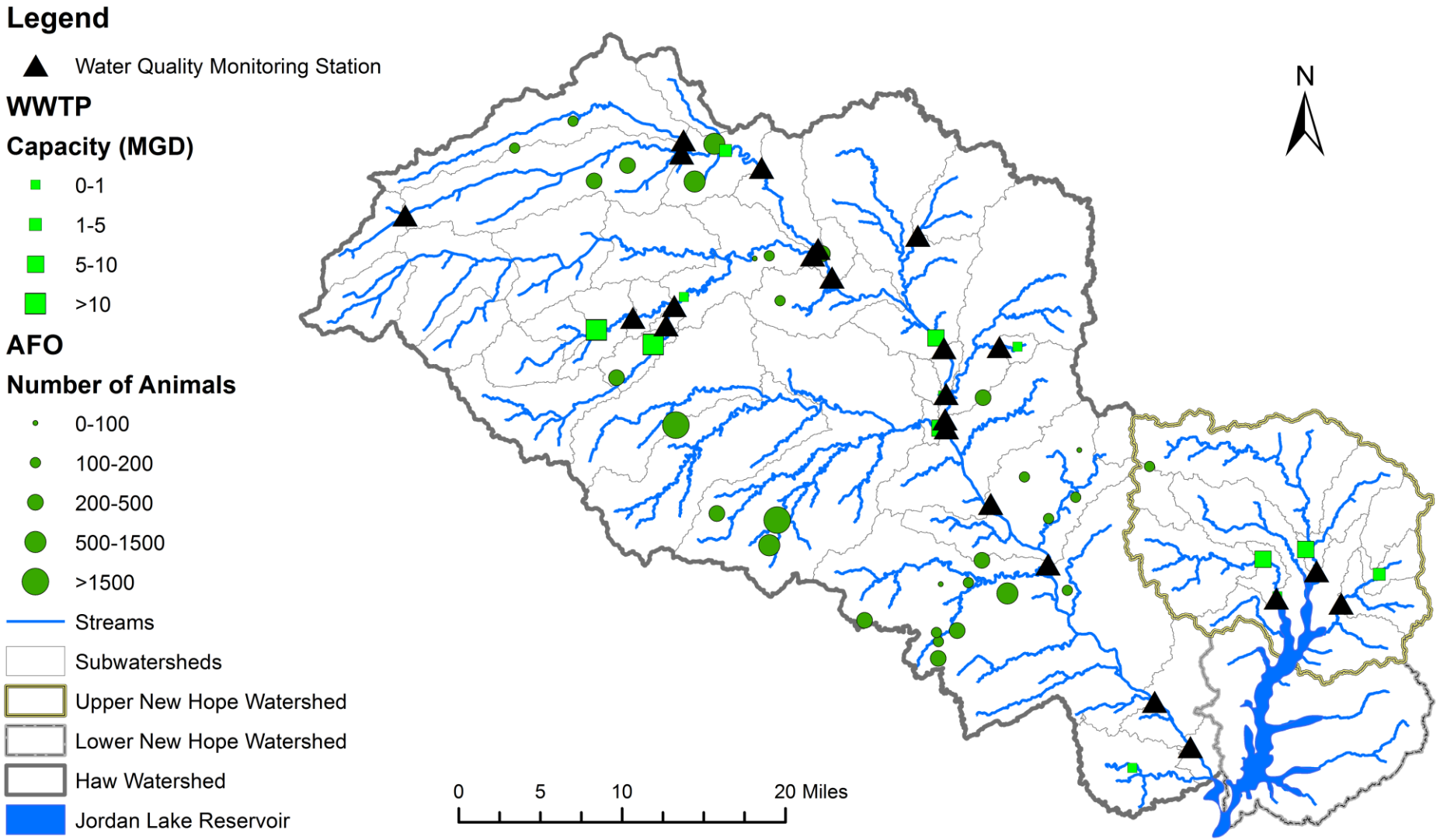
Project Research Objectives



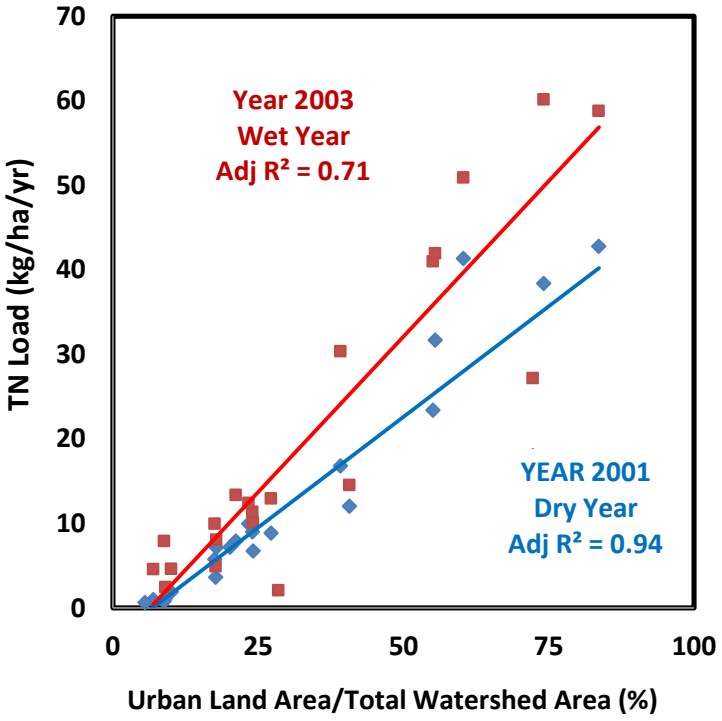
Project Research Results

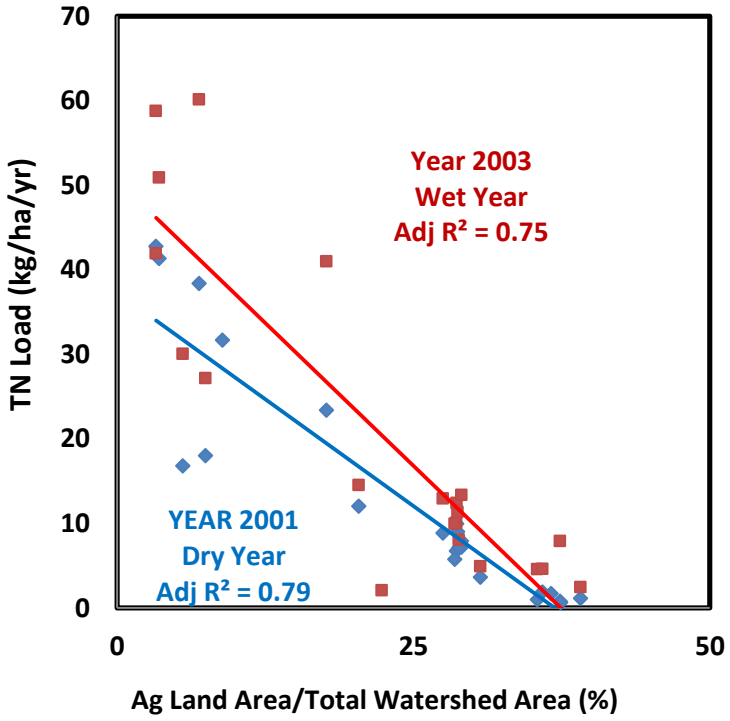


Watershed Data

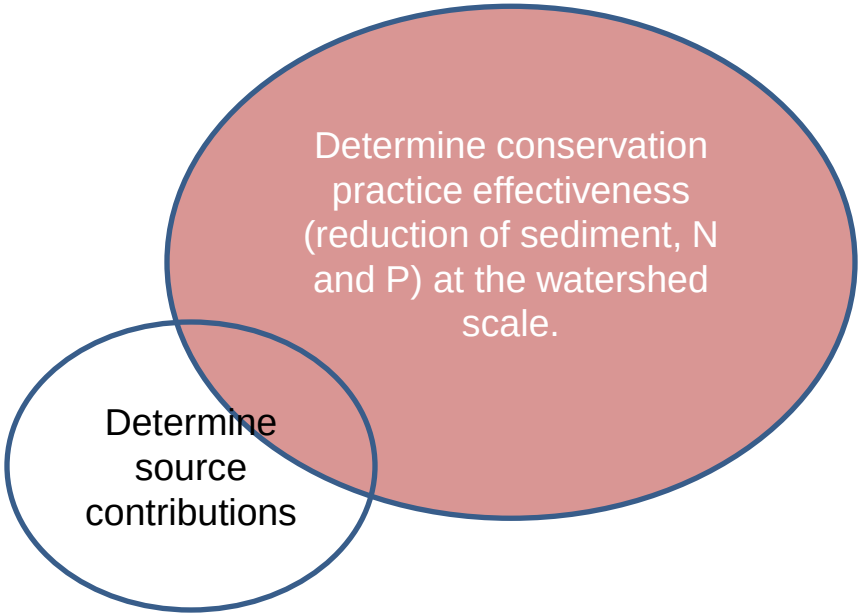


Total Nitrogen (TN) Source Losses





Project Research Results



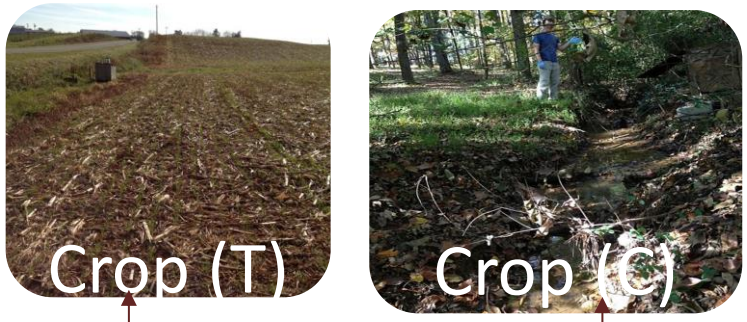
Conservation Practice Effectiveness

- Two paired watersheds monitored 8 years (pasture) and 6 years (cropland)
- Treatment sub-watersheds based on farmer cooperation
- Pasture conservation practices: exclusion fencing and nutrient management
- Cropland conservation practice: N management (corn only in a 3 crop, 2 year rotation of corn, wheat, and soybean)

Control and Treatment Pastures

Pasture Pair

Control and Treatment Croplands

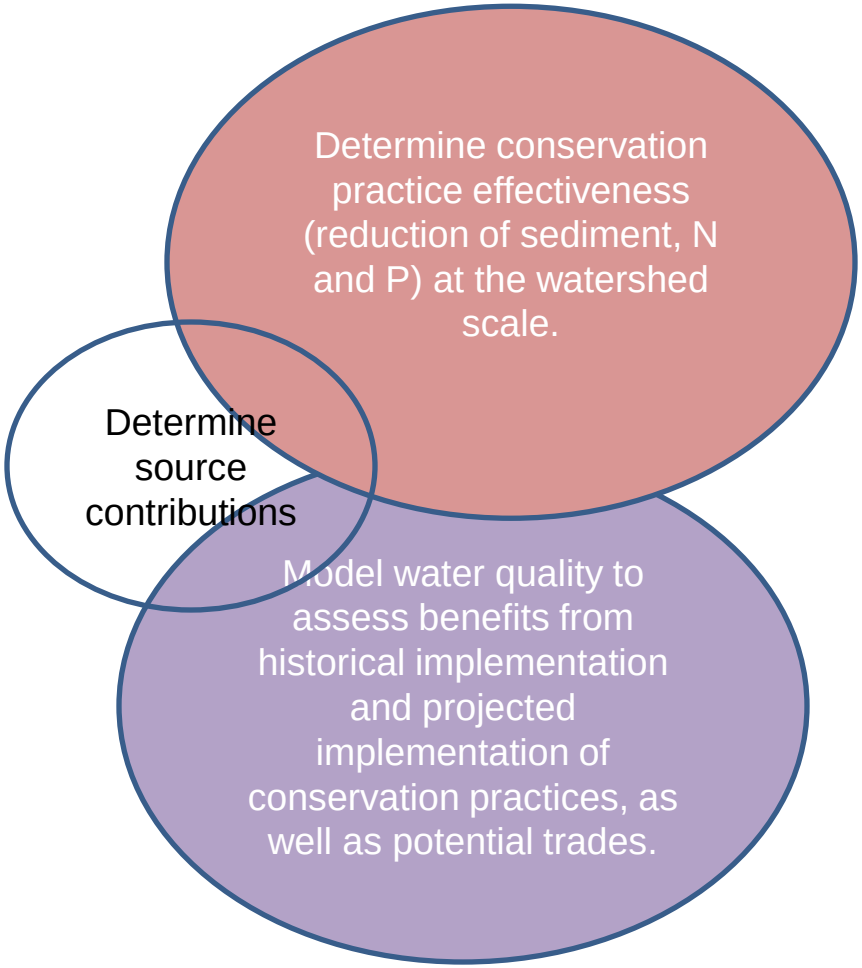


Crop Pair

Conservation Practice Effectiveness: Pasture Nutrient and Sediment Reduction

Constituent	Average Nutrient Load Both Watersheds (kg/ha/yr)	Reduction Due to Exclusion Fencing (%)
TKN	5.3	48
NO_x-N	1.2	41
NH4-N	1.3	64
TP	3.0	61
TSS	333	73

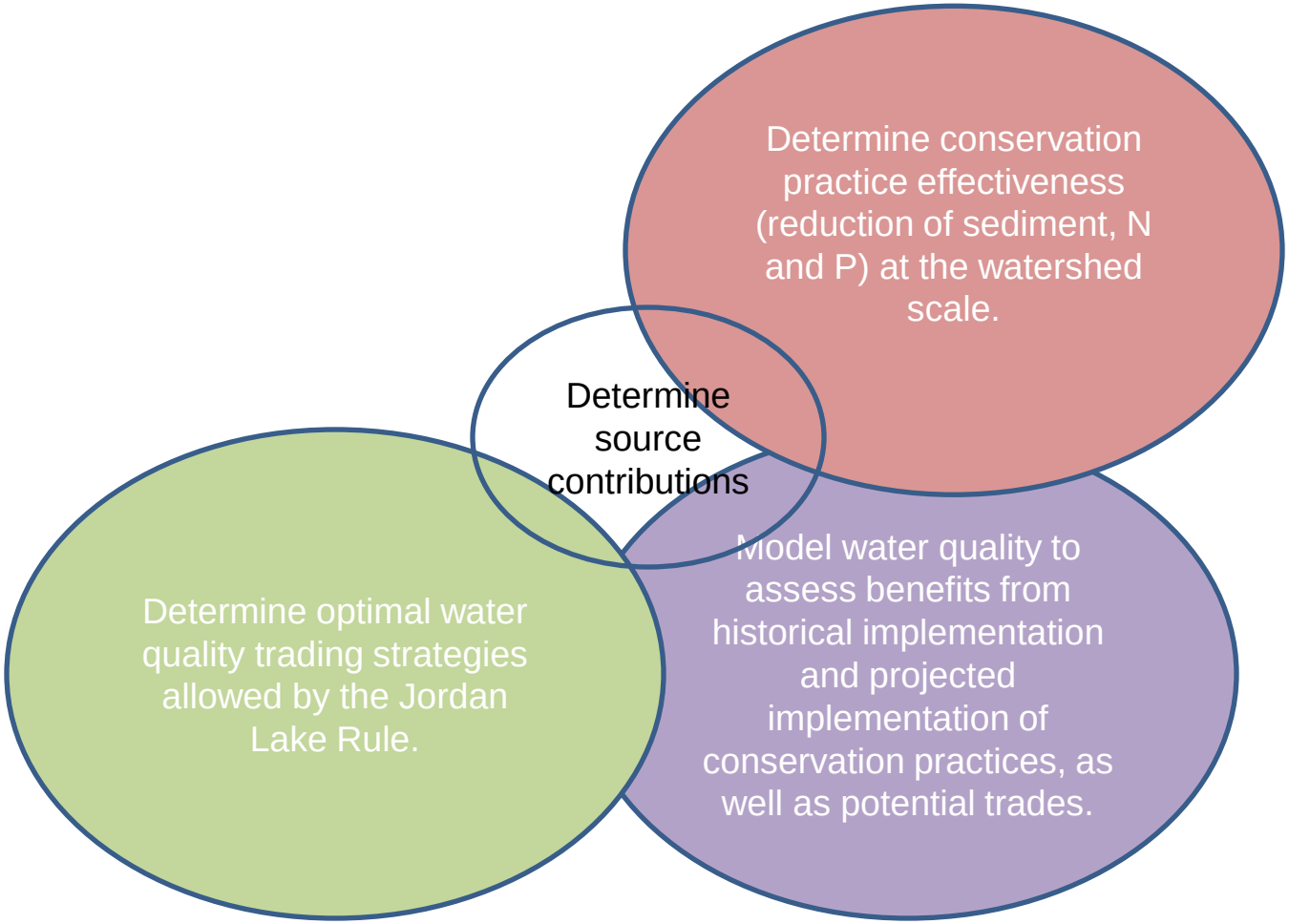
Project Research Results



SWAT Nutrient Delivery to Jordan Lake: Agricultural Baseline vs Current Climate With and Without Riparian Buffers

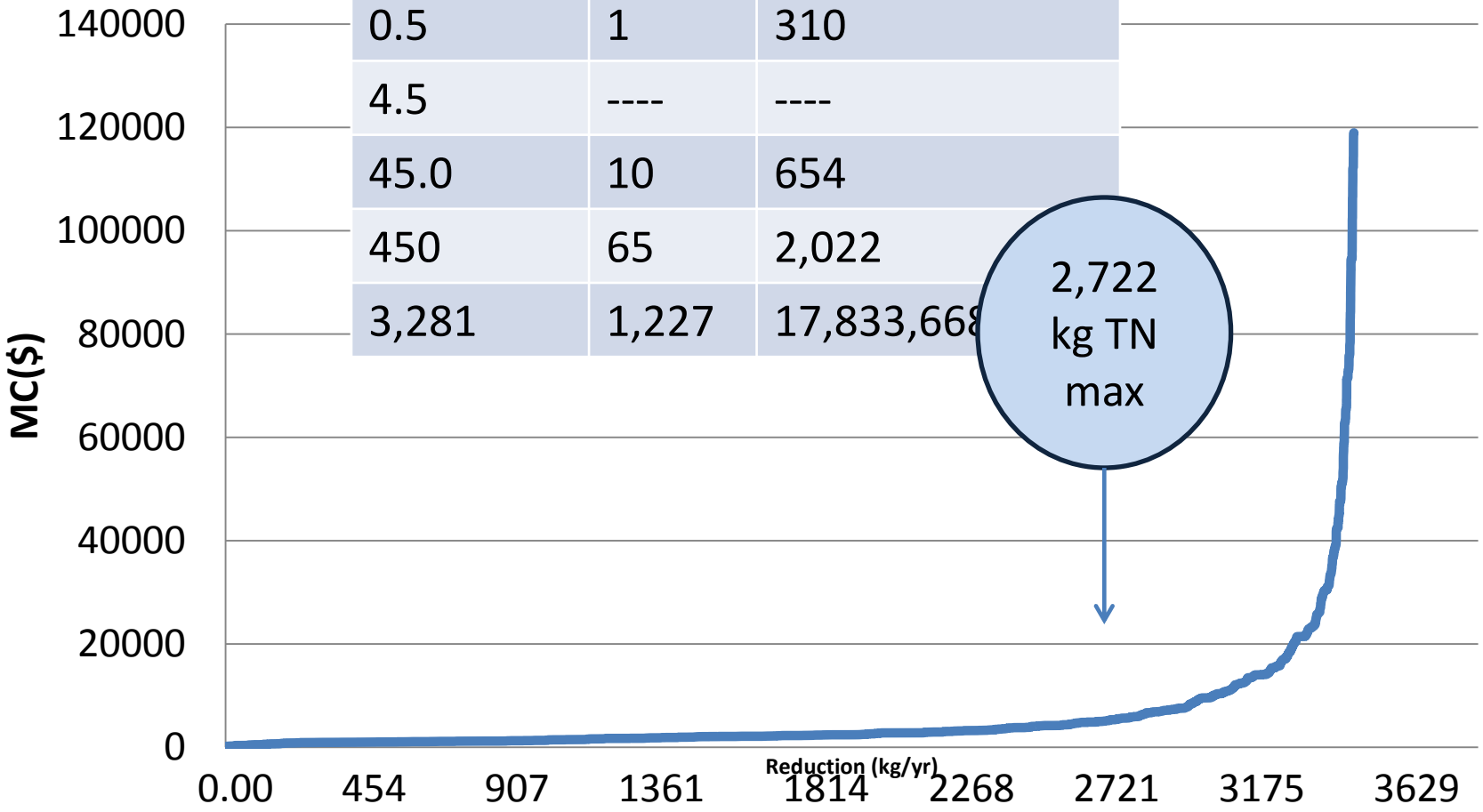
Constituent Total Load (kg) Constituent Load per Acre (kg/ha)	Baseline (1997-2001)	Current Climate NO Riparian Buffers	Current Climate With Riparian Buffers
Total TN Load (kg)	16,612	26,716	17,420
Total TP load (kg)	10,589	18,361	8,603
Average TN (kg/ha)	0.92	1.48	0.96
Average TP (kg/ha)	0.59	1.02	0.47

Project Research Results

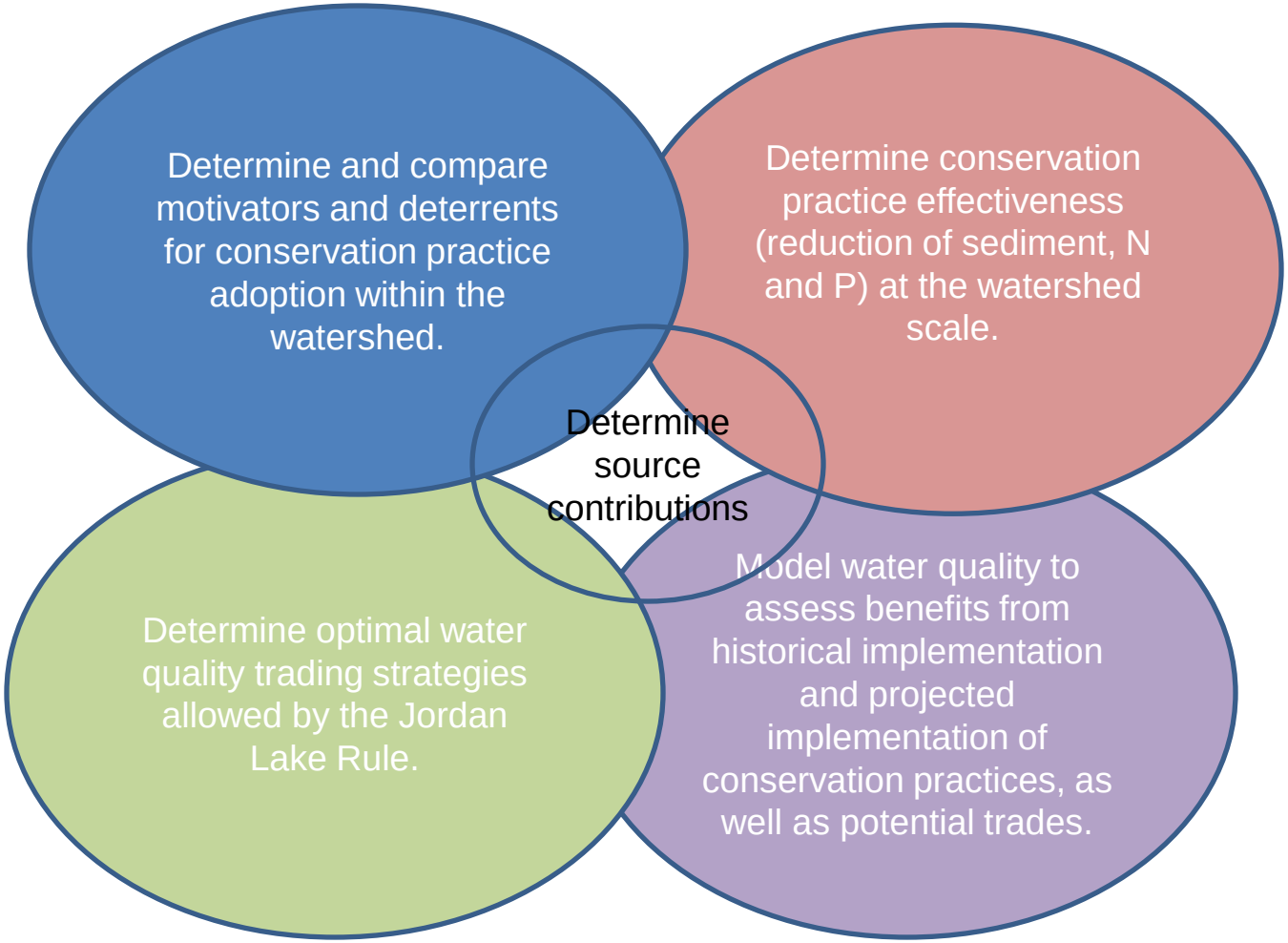


Marginal Cost of Riparian Buffer Installation Relative to Total Nitrogen Reduced

Reduction (kg TN)	# fields	Marginal Costs ($/kg TN)
0.5	1	310
4.5	----	----
45.0	10	654
450	65	2,022
3,281	1,227	17,833,668



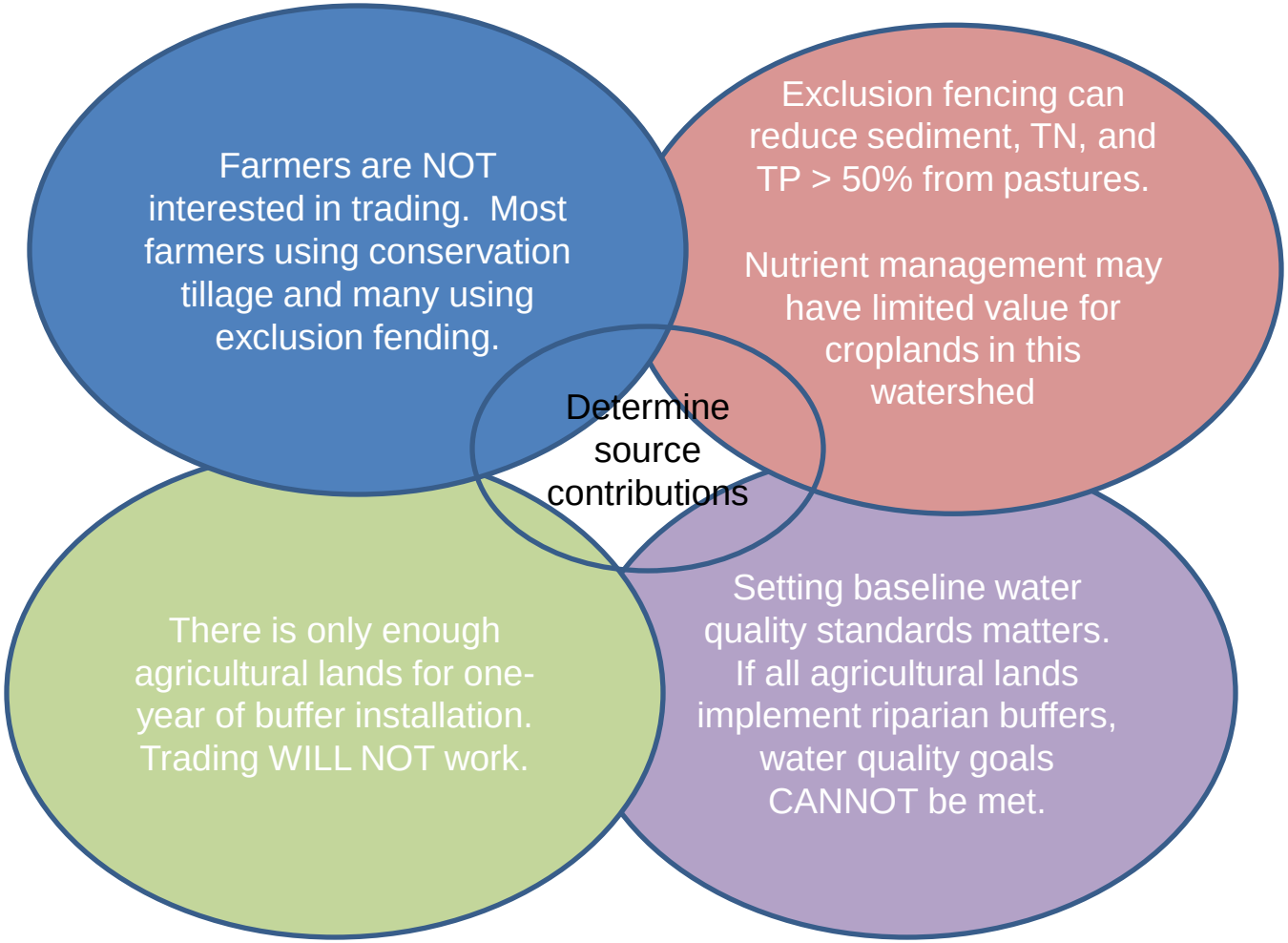
Project Research Results



Farmer Decision Making

- 90 farmers interviewed
- Questions open-ended: described area farming systems, conservation practices, nutrient management, water quality, and willingness to trade
- 92.5% cropland farmers using conservation tillage. Practice started over 40 years ago.
- 62% pasture-based farmers using exclusion fencing. Practice started in mid-1990s.
- Nutrient management is not viewed as a conservation practice.
- Most farmers were very negative about trading as they thought the development community should meet their obligations.

Conclusion:
The Policy Is Flawed



Provided agricultural community, city officials, and regulators with knowledge about what can and cannot be accomplished through agricultural conservation practices, including trading.

Acknowledgements

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  - USDA NIFA (#2011-05151)
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- Farmers, and Soil and Water Conservation and extension personnel

Questions