AgriLIFE RESEARCH
Texas A&M System

Effects of Agricultural Management, Land Use, and Watershed Scale on *E. coli* Concentrations in Runoff and Streamflow

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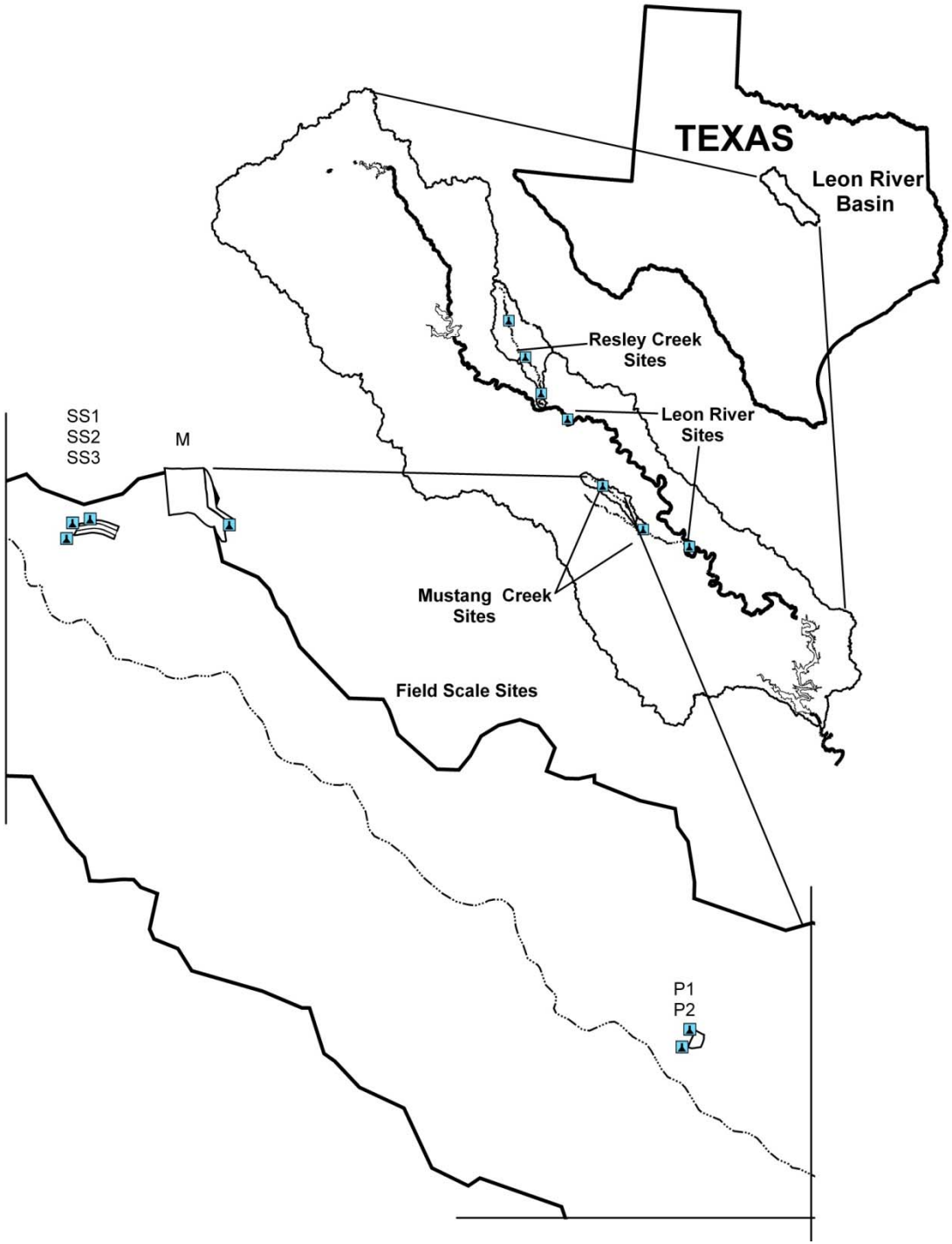
Improving Life through Science and Technology.

Different Scales and Land Uses

- Field
  - Grazed pasture
  - Cultivated
  - Cultivated & grazed
- Small watershed
  - Mixed rural
  - Mixed rural with dairies, irrigated fields, WWTP
- River basin
  - Mixed rural with dairies, WWTPs, small communities


TEXAS
Leon River Basin
Resley Creek Sites
Leon River Sites
SS1
SS2
SS3
M
Mustang Creek Sites
Field Scale Sites
P1
P2

Sampling Sites

Site	Scale	Land Use	Area
P1	Field	Grazed pasture	0.4 ha
P2	Field	Grazed pasture	0.3 ha
SS1	Field	Cultivated	0.9 ha
SS2	Field	Cultivated	0.9 ha
SS3	Field	Cultivated	1.2 ha
M	Field	Cultivated (80%), Grazed pasture (20%)	18.1 ha
Mustang Creek (MC1, MC2)	Small watershed	Mixed rural	14.7 km^2 (MC1) 55.1 km^2 (MC2)
Resley Creek (RC1, RC2, RC3)	Small watershed	Mixed rural with dairies, irrigated fields, WWTP	57.6 km^2 (RC1) 128.9 km^2 (RC2) 217.5 km^2 (RC3)
Leon River (LR1, LR2)	River basin	Mixed rural with dairies, WWTPs, small communities	5200 km^2 (LR1) 6070 km^2 (LR2)

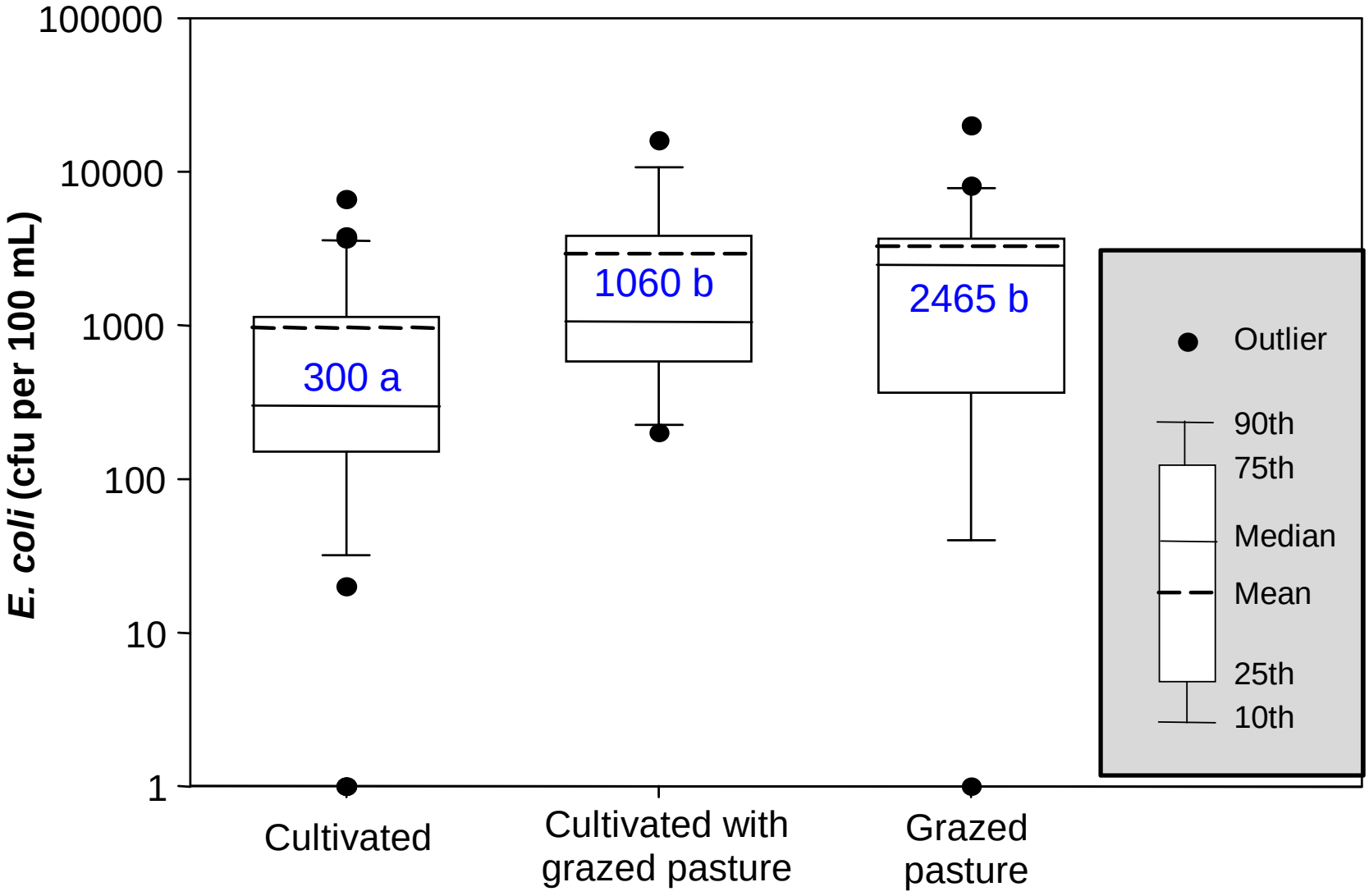
Sampling & Analysis

- Types of water samples
  - Edge-of-field runoff (field-scale)
  - Stream (small watershed & river basin)
    - ~ Every 2 wks & runoff events
- Samples collected 2005 to 2009
- *E. coli* enumerated using m-ColiBlue24®

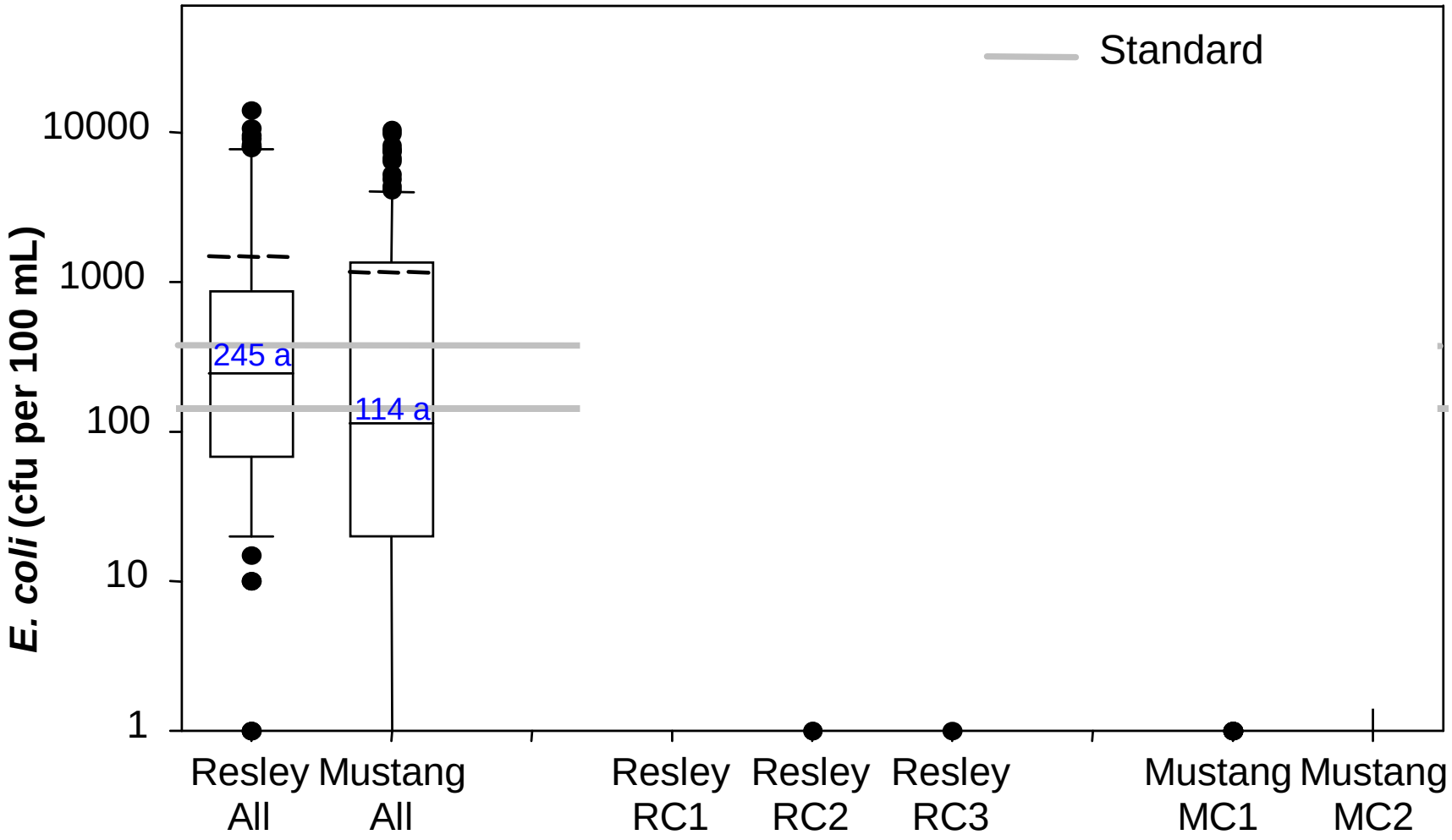
Samples Collected

Site	Scale	Land Use	No. of Samples
P1	Field	Grazed pasture	11
P2	Field	Grazed pasture	12
SS1	Field	Cultivated	15
SS2	Field	Cultivated	15
SS3	Field	Cultivated	16
M	Field	Cultivated (80%), Grazed pasture (20%)	14
Mustang Creek (MC1, MC2)	Small watershed	Mixed rural	127
Resley Creek (RC1, RC2, RC3)	Small watershed	Mixed rural with dairies, irrigated fields, WWTP	74
Leon River (LR1, LR2)	River basin	Mixed rural with dairies, WWTPs, small communities	172

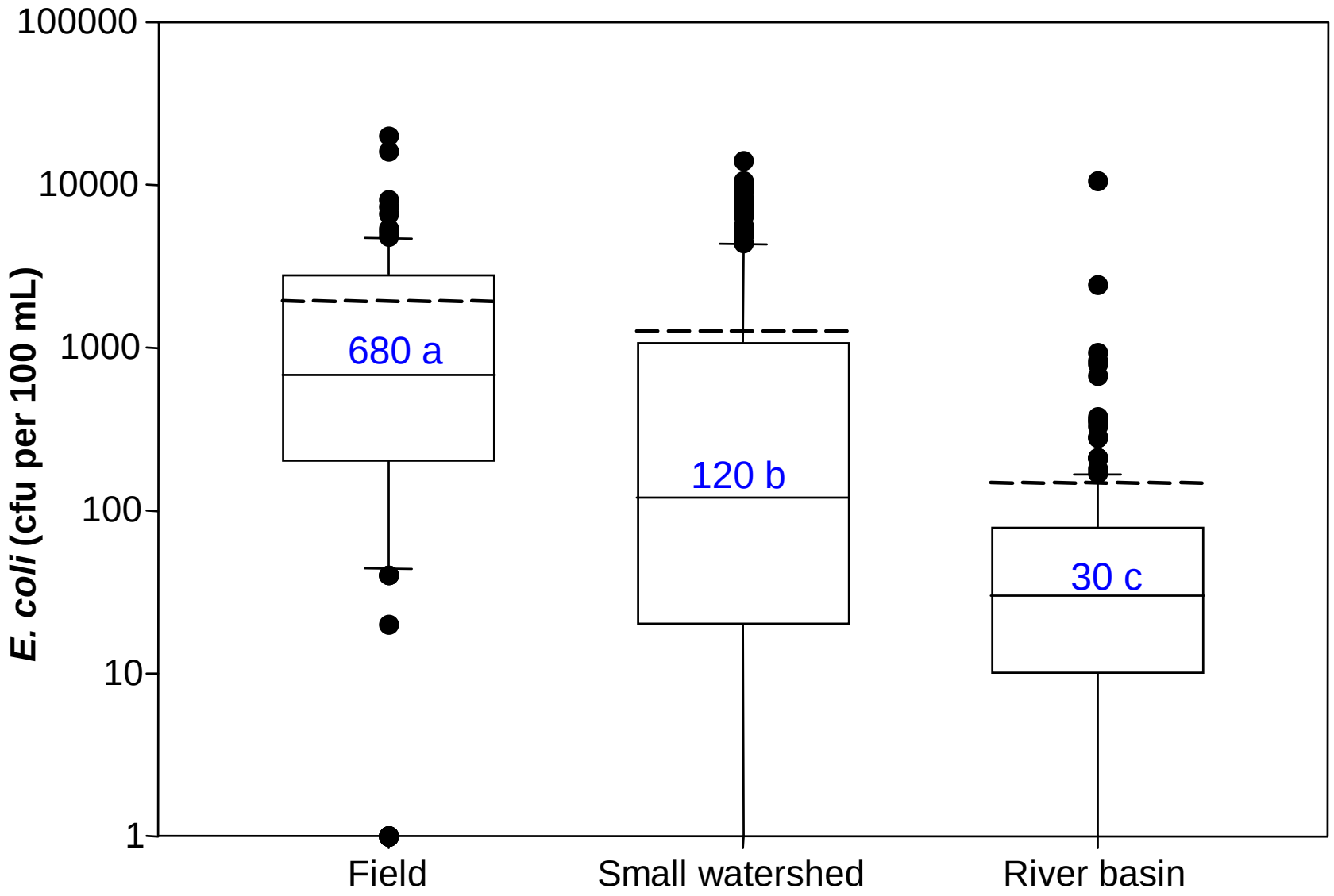
Land Use Effects on *E. coli* Levels: Field-Scale



Land Use Effects on *E. coli* Levels: Small Watershed-Scale



Watershed Scale Effects on *E. coli* Levels



Conclusions

- **Grazed fields had higher levels of *E. coli* in edge-of-field runoff samples than did cultivated fields**
- **No significant difference in *E. coli* levels due to land use at the small watershed-scale**
- ***E. coli* levels decreased as watershed scale increased**
  - **Consideration of watershed scale in water quality standards?**

For More Details:

Harmel, R.D., R. Karthikeyan, T. Gentry, and R. Srinivasan. 2010. Effects of agricultural management, land use, and watershed scale on *E. coli* concentrations in runoff and streamflow. Trans. ASABE 53:1833-1841.

Questions?

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