Lone Star Healthy Streams: Clean Water for Texans

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LSHS Education Program

Educational Curriculum Materials:
- PowerPoint Presentation (under review)
- White Paper (under review)
- Online Presentation (future activity)

Focus:
- Background on water quality management
- BMPs to protect water quality
  - Maintain adequate ground cover
    - Stocking Rate / Grazing Systems
    - Forage Selection / Management
    - Nutrient & Pest Management
  - Vegetative Filter Strips / Riparian Area Protection
- Results of BMP Evaluation

At Issue:

- Bacteria impaired Texas waterbodies
  - 295 listed on 303(d) List in 2008
- Probable sources
  - Wastewater, urban, livestock, wildlife
- Prior recommendations for livestock…
  - Fence out the stream?
- Lone Star Healthy Streams
  - Funded by TSSWCB, NRCS, and EPA

Lone Star Healthy Streams

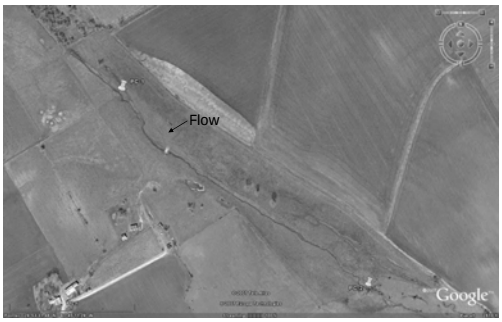
The goal:
- Reduce the levels of bacterial contamination of Texas watersheds from grazing livestock

The approach:
- Develop an educational curriculum
- Evaluate & demonstrate effectiveness of BMPs
- Test the education program
- Promote statewide adoption of BMPs

Alternative Water & Shade Evaluation (2S Ranch, Lockhart)

Alternative Water & Shade Evaluation

Samples collected bi-monthly at ranch inlet (PC1) & outlet (PC2)



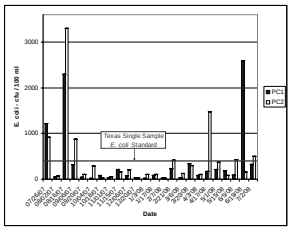
Alternative Water & Shade Evaluation

Cattle Tracking – quarterly using GPS collars

Alternative Water & Shade Evaluation

Preliminary Results – Year 1 Pre-BMP

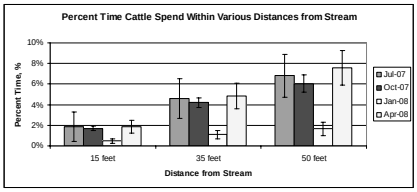
- *E. coli* at PC2 > PC1 in 75% of samples
- PC2 *E. coli* > TWQS in 33% of samples
- PC1 *E. coli* > TWQS in 12.5% of samples



Alternative Water & Shade Evaluation

Preliminary Results – Year 1 Pre-BMP

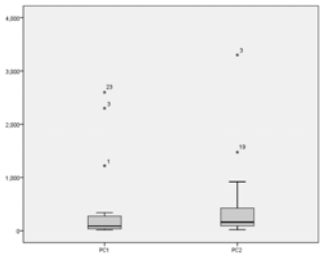
- July, October and April = No alternative water
- January = Alternative water provided for 2 weeks
- % time near creek reduced 75% in January
  - Consistent with published values



Alternative Water & Shade Evaluation

Preliminary Results – Year 1 Pre-BMP

- Median *E. coli* concentration:
  - PC1 = 89 cfu/100 ml
  - PC2 = 161 cfu/100 ml



Alternative water supply effectiveness

Reduction in Time Spent in Stream	Reduction in Time Spent near Stream	Percent time cattle drank from trough	Reference
90%			Miner et al. (1992)
85%	53%	73.5%	Clawson (1993)
	75%		Godwin and Miner (1996)
		92%	Sheffield et al. (1997)

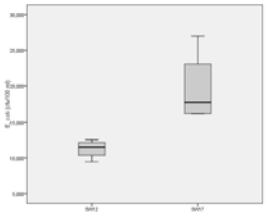
Evaluation of Grazing Mgt

- Study Sites
  - Welder Wildlife Foundation – native rangeland
  - Riesel Experiment Station – improved pasture
  - Beef Cattle Systems Center – irrigated pasture
- Treatments
  - No grazing
  - Moderate grazing
  - Heavy grazing (2 x moderate grazing)

Evaluation of Grazing Mgt

Riesel Experiment Station

- All samples exceed water quality stds.
- *E. coli* levels are significantly higher at grazed site (SW17) than the ungrazed site (SW12)

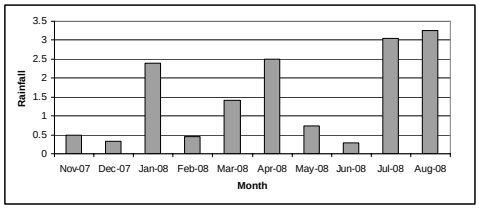


Ungrazed Mod. Grazed

Evaluation of Grazing Mgt

Welder Wildlife Foundation

- No runoff since work began in Nov. 2007
- 15 inches of rain since Nov. 2007



Evaluation of Grazing Mgt

Riesel Experiment Station

- Flow weighted concentrations at Riesel (07/07-07/08)
  - Ungrazed SW12 = 10,032 cfu/100 ml
  - Mod. grazed SW17 = 22,815 cfu/100 ml
- Doran et al. (1981)
  - Ungrazed = 13,280 cfu/100 ml fecal coliform ~8,366 cfu/100 ml *E. coli*
  - Mod. grazed = 113,700 cfu/100 ml fecal coliform ~71,631 cfu/100 ml *E. coli*
- Robins et al. (1972)
  - Ungrazed = 10,000 cfu/100 ml fecal coliform ~6,300 cfu/100 ml *E. coli*
  - Mod. grazed = 30,000 cfu/100 ml fecal coliform ~18,900 cfu/100 ml *E. coli*

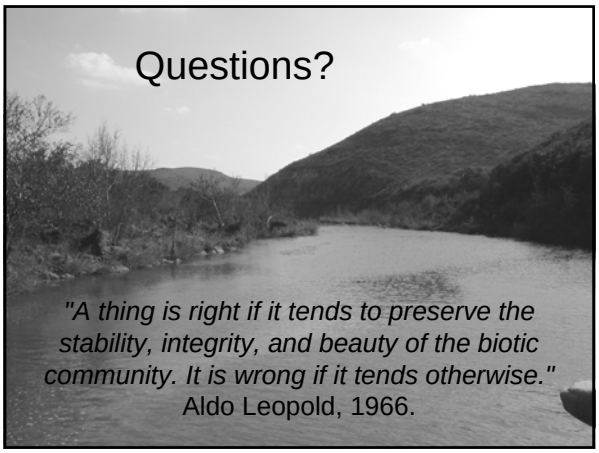
Evaluation of Grazing Mgt

Beef Cattle Systems Center

- Site set up in progress
- Expect to go online soon

Significant Observations To Date

- Alternative water = possible 75% reduction in the percent time cattle spend near creek
- *E. coli* levels in runoff from grazed pasture are significantly greater than levels in runoff from ungrazed native prairie
- *E. coli* levels in runoff from ungrazed native prairie are significantly greater (i.e. 2 orders of magnitude) than Texas Water Quality Standards


Questions?
"A thing is right if it tends to preserve the stability, integrity, and beauty of the biotic community. It is wrong if it tends otherwise."
Aldo Leopold, 1966.