Lampasas River Watershed Partnership

Agricultural Issues Work Group

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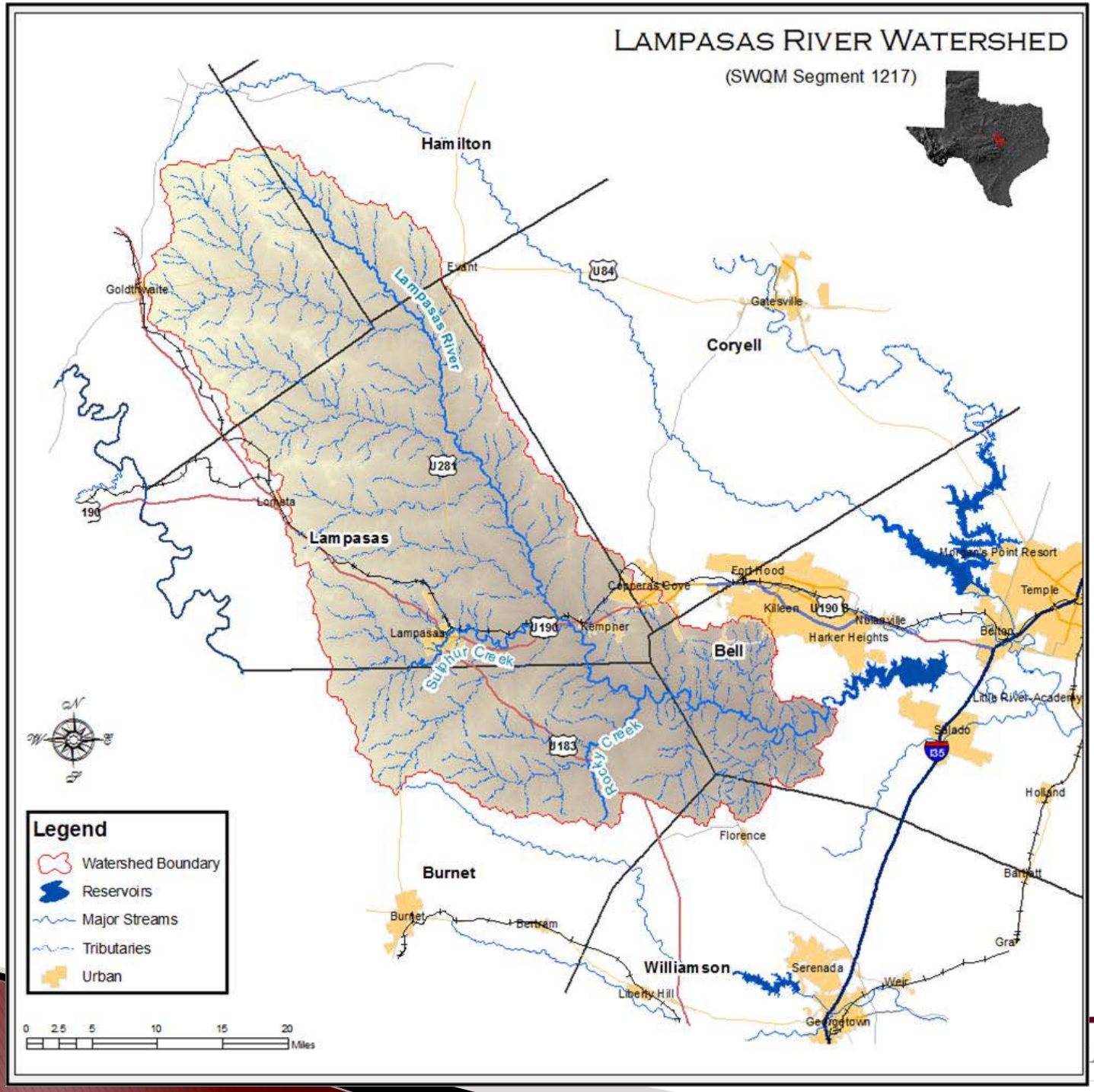
Texas AgriLife Research at
Blackland Research & Extension Center

Agricultural Issues Work Group

- Discuss specific causes and sources of nonpoint source pollution stemming from livestock and general agricultural and silvicultural sources
- Estimate populations and distribution of possible sources, including:
  - Livestock
  - Horses
  - Runoff from cropland
- Identify and recommend strategies to the Steering Committee to reduce and abate pollution from these sources



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Stakeholder Concerns

- What concerns do you have about the watershed?

Land Use/Land Cover Analysis

County and Watershed Acreage

County	Total (acres)	Watershed in County (acres)
Bell	695,340	72,457
Burnet	652,364	171,906
Coryell	675,943	7,043
Hamilton	534,838	46,620
Lampasas	456,673	351,326
Mills	479,613	139,185
Williamson	727,138	9,838
Total	4,221,908	798,375

County and Watershed Percentages

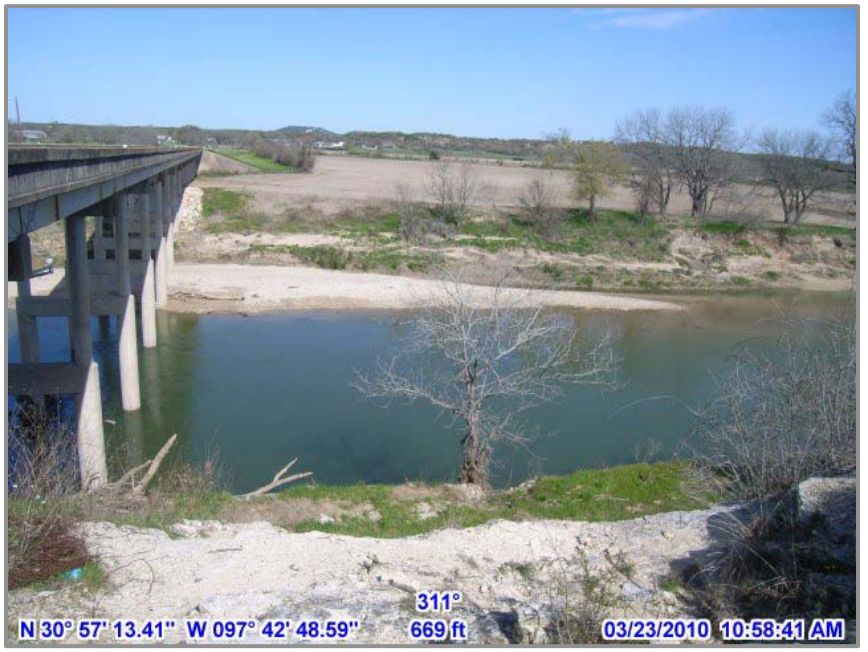
County	Percent of County in Watershed	Percent of Watershed in County
Bell	10%	9%
Burnet	26%	22%
Coryell	1%	1%
Hamilton	9%	6%
Lampasas	77%	44%
Mills	29%	17%
Williamson	1%	1%

Methods Used

- **National Agriculture Imagery Program (NAIP) Digital Ortho Imagery**:
  - NAIP Ortho photos are collected and compiled each year by the United States Department of Agriculture (USDA) Farm Service Agency (FSA) during a portion of the agricultural growing season at a one or two meter resolution (2008).
- **National Land Cover Dataset:**
  - The NLCD was developed using a decision-tree classification approach for multi-temporal Landsat imagery and several ancillary datasets. The category of urban land was extracted from the dataset using the ArcGIS Spatial Analyst extension to compare and compliment the NAIP classification (2001).
- **Crop Data Layer:**
  - The CDL was used in the classification process to gather in depth cropland points in the watershed. A CDL is a small unit of land that has a permanent, contiguous boundary, with a common land use and owner, and a common producer in agricultural land associated with USDA farm programs. CDL boundaries are delineated from relatively permanent features such as fence lines, roads, and/or waterways (FSA)(2008).
- **Ground Truth Data**:
  - Samples for each LU/LC class within the study were gathered using Trimble GeoXH 2005 and RICOH Caplio 500SE 1.38 Rev 2 units, as well as digital sampling of high-resolution aerial photography. The primary focus of the field collection process was to collect ground control points across the entire area, particularly in classes which were difficult to distinguish.

Land Use Definitions

- Water: All areas of open water, generally with less than 25% cover of vegetation or soil



Land Use Definitions continued

- Urban: Includes areas with a mixture of some constructed materials and lawn grasses. These areas most commonly include residential and commercial developments

Land Use Definitions continued

- Forest: Areas dominated by trees generally greater than 15 feet tall, greater than 50% of total vegetation cover and areas adjacent to streams, creeks and/or rivers

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Land Use Definitions continued

- Pasture:
  Transitional area between unmanaged rangeland and managed pasture

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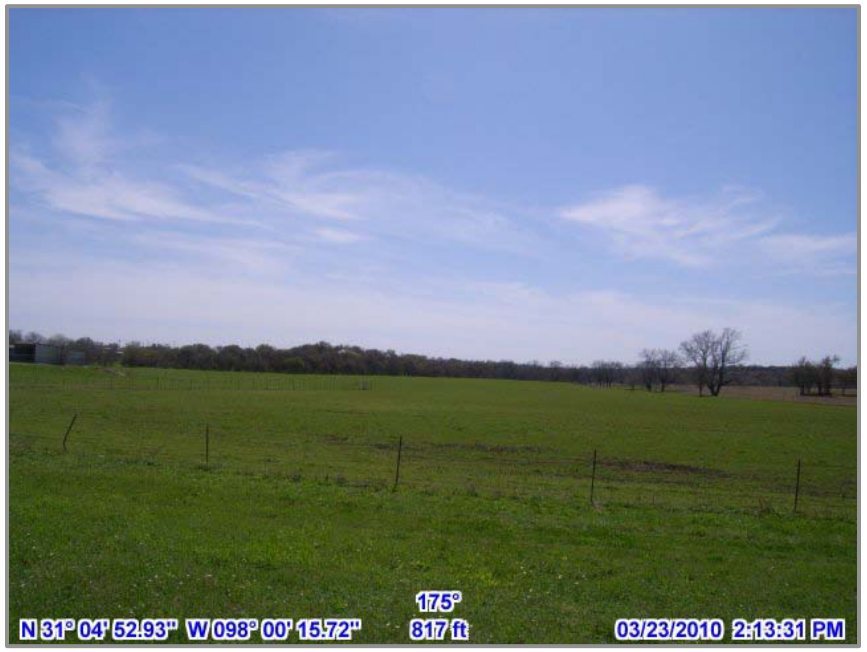
Land Use Definitions continued

- Managed Pasture: Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops



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Land Use Class Definitions continued

- Rangeland: Areas of unmanaged shrubs, grasses, or shrub-grass mixtures

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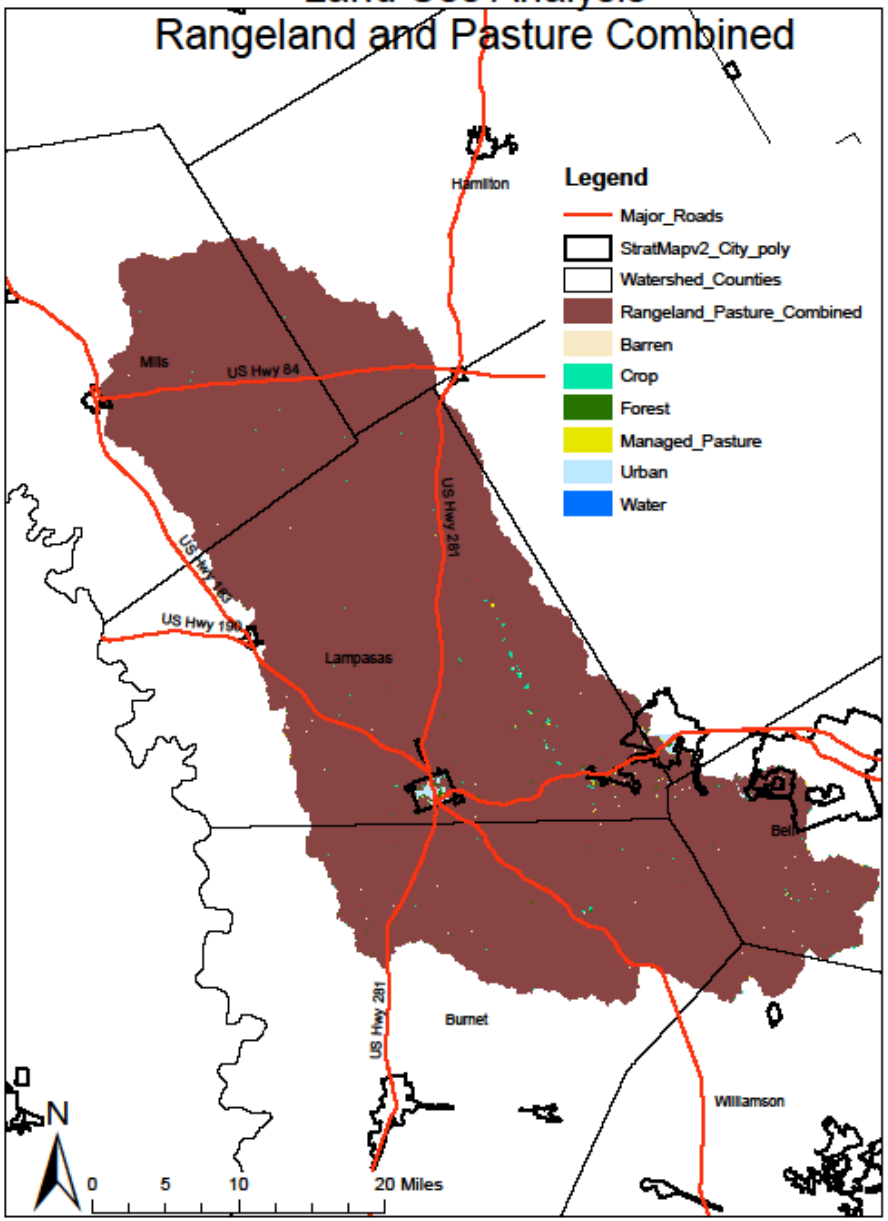
Land Use Class Definitions continued

- Barren: (Rock/Sand/Clay) – Barren areas of bedrock, desert pavement, scarps, slides, strip mines, gravel pits, construction sites and other accumulations of earthen material – vegetation accounts for less than 15% of total cover and includes transitional areas

Land Use Class Definitions continued

- Crops: Areas used for the production of annual crops, such as corn, soybeans, vegetables and cotton and also perennial crops such as orchards – also includes all land being actively tilled

Lampasas River Watershed
Land Use Analysis
Rangeland and Pasture Combined



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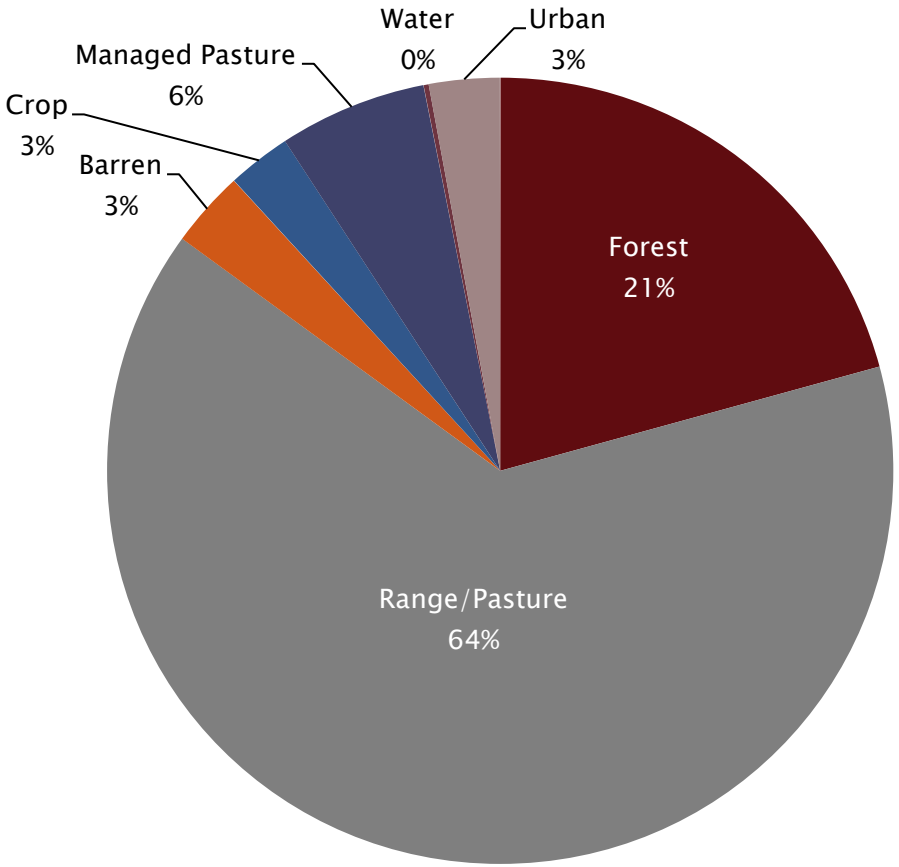
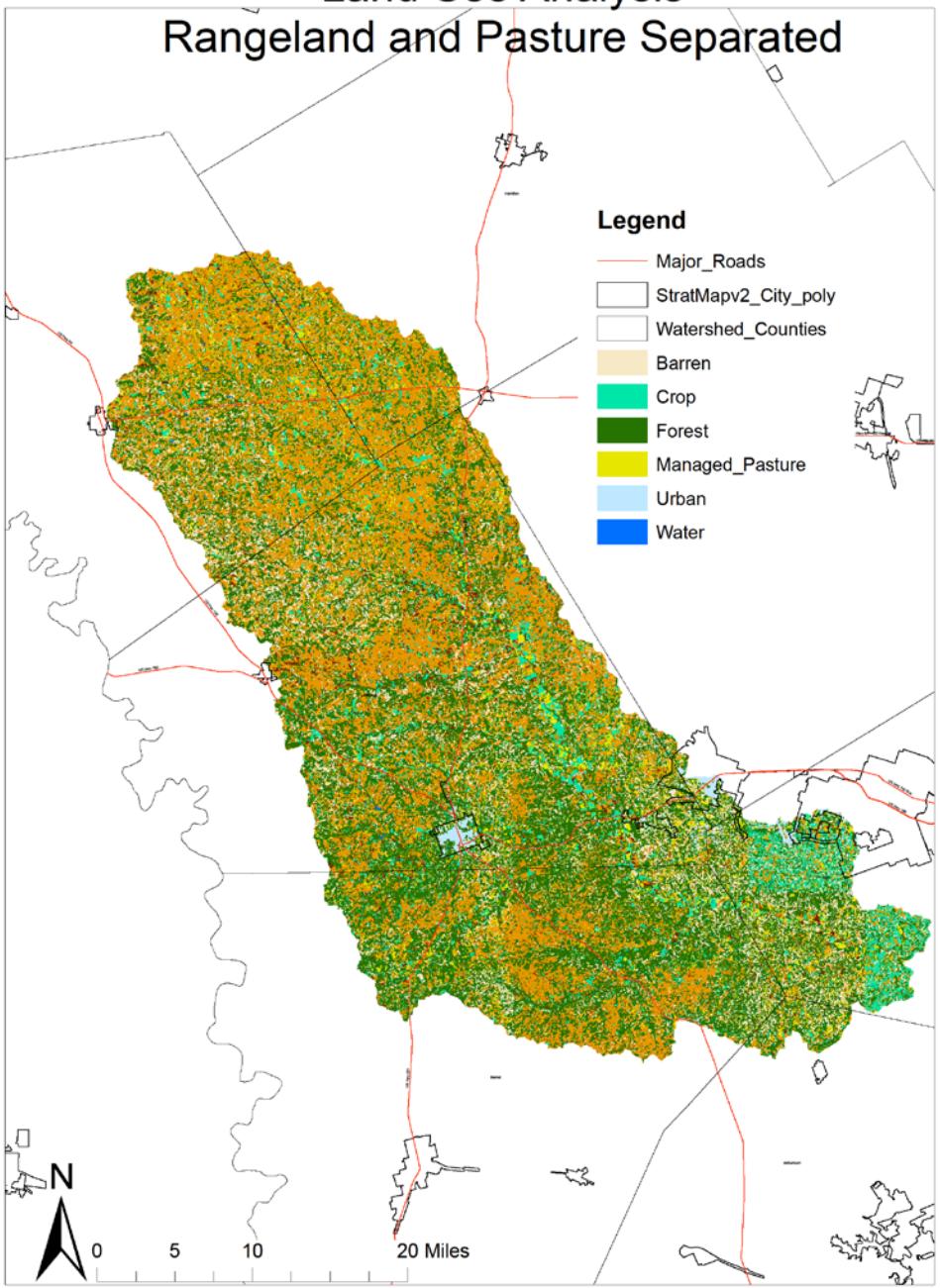
Watershed Land Use/Land Cover

Rangeland and Pasture Combined



- Forest – 195,945
- Range/Pasture – 607,769
- Barren – 29,799
- Crop –24,560
- Managed Pasture – 57,550
- Water – 1,973
- Urban – 27,544

Lampasas River Watershed
Land Use Analysis
Rangeland and Pasture Separated



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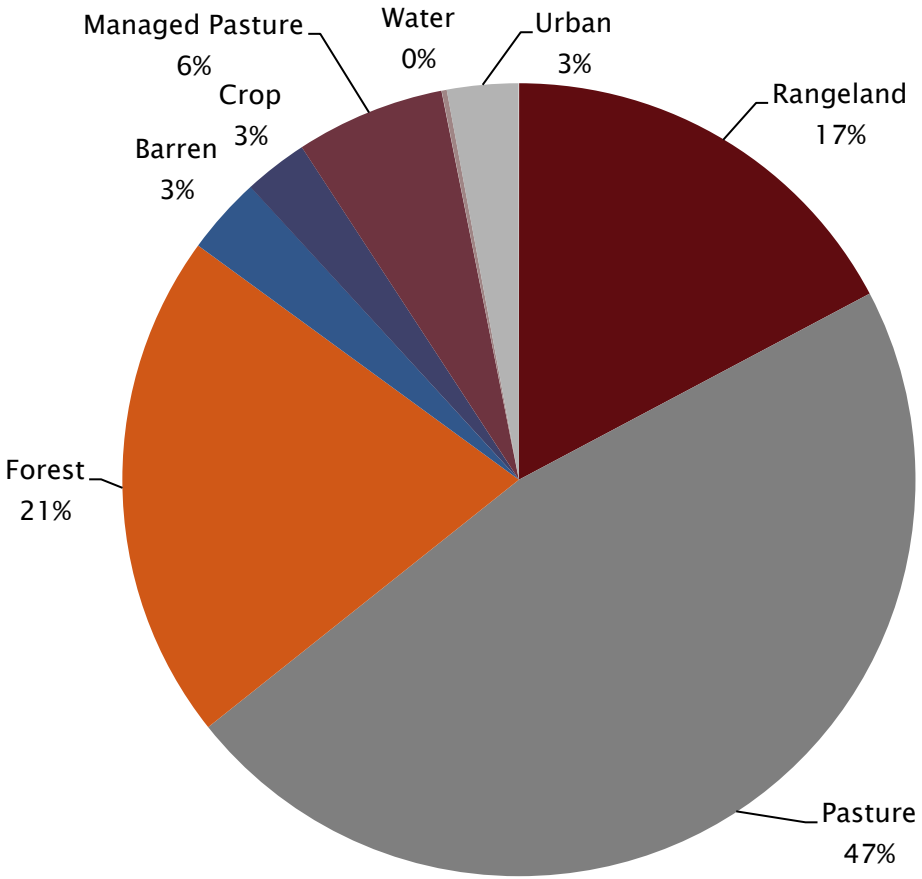
Watershed Land Use/Land Cover

Rangeland and Pasture Separated



- Rangeland – 162,870
- Pasture – 444,900
- Forest – 195,945
- Barren – 29,799
- Crop –24,560
- Managed Pasture – 57,550
- Water – 1,973
- Urban – 27,544

Watershed Land Use/Land Cover

- Accuracy based on ground-truthing
  - Rangeland and Pasture Combined = 87%
  - Rangeland and Pasture Separated = 71%
    - Difficult to distinguish between rangeland and pasture digitally

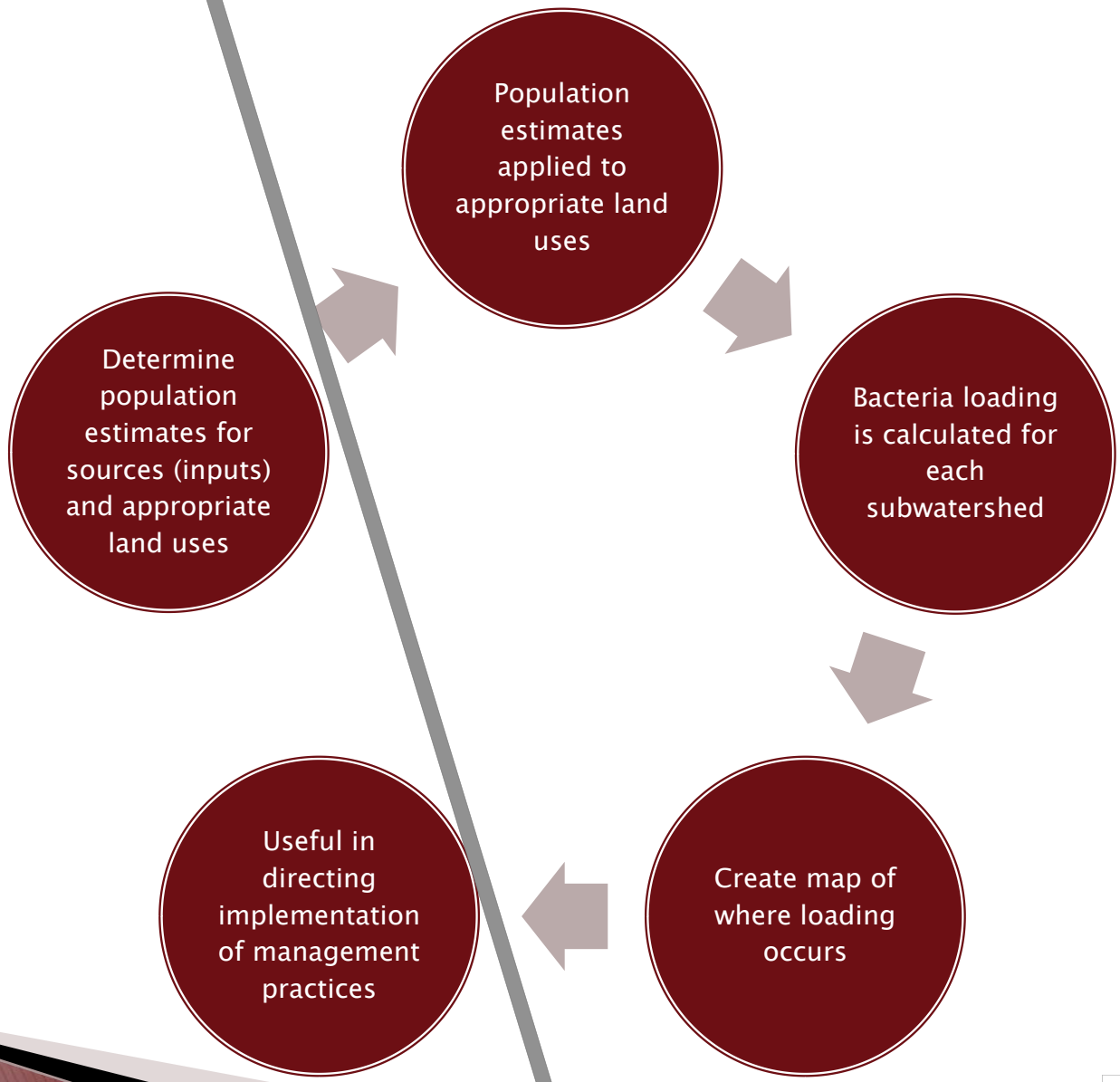
Sources and Distribution of Nonpoint Source Pollutants

SELECT Model

- Stakeholders estimate populations that may contribute to bacteria loading (Inputs)
- Land use lets us locate those sources in the correct areas of the watershed
- SELECT uses estimated populations and land use to estimate loadings from sources
- WPP is developed with a more clear understanding of sources and loading estimates

Work Group Functions

SELECT Functions



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SELECT Inputs

- Agricultural Issues Work Group
  - Livestock – cattle, horses, sheep and goats
  - Cropland fertilizer application
- Habitat and Wildlife Work Group
  - Whitetail deer
  - Feral hogs
- Urban/ Suburban Issues Work Group
  - Pet populations
  - Urban stormwater runoff
- Wastewater Infrastructure Work Group
  - Septic systems
  - WWTP data

Pollutant Sources

- Livestock
  - Cattle
  - Goats
  - Sheep
  - Horses
- Fertilizer application
- Illegal dumping

Pollutant Sources with Data

- Livestock
  - Cattle
  - Goats
  - Sheep
  - Horses
- Fertilizer application (cropland)
- Other pollutant data sources???

Population Estimates – Livestock

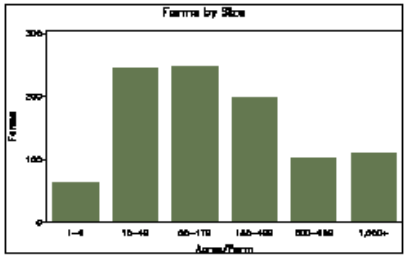
- Must have population estimates to estimate bacteria
- How do we estimate the number of cattle, horses, sheep and goats are in the watershed?
- Are there surveys that tell us where and how many animals area in the watershed?
- Yes… USDA National Agricultural Statistics Service
  - Taken every five years
  - Based on responses to mailings to farm & ranch operators

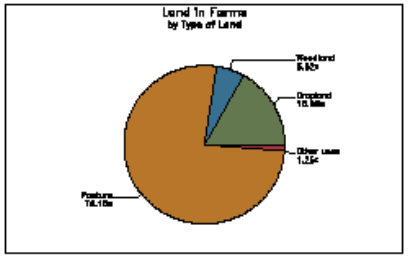
NASS Lampasas County Census

2007 CENSUS OF AGRICULTURE
County Profile

Lampasas County
Texas

	2007	2002	% change
Number of Farms	966	861	+ 12
Land in Farms	416,018 acres	412,491 acres	+ 1
Average Size of Farm	431 acres	479 acres	- 10
Market Value of Products Sold	$13,972,000	$13,375,000	+ 4
Crop Sales $2,122,000 (15 percent) Livestock Sales $11,850,000 (85 percent)			
Average Per Farm	$14,464	$15,534	- 7
Government Payments	$208,000	$354,000	- 41
Average Per Farm Receiving Payments	$2,541	$2,389	+ 6





USDA United States Department of Agriculture
National Agricultural Statistics Service
www.agcensus.usda.gov

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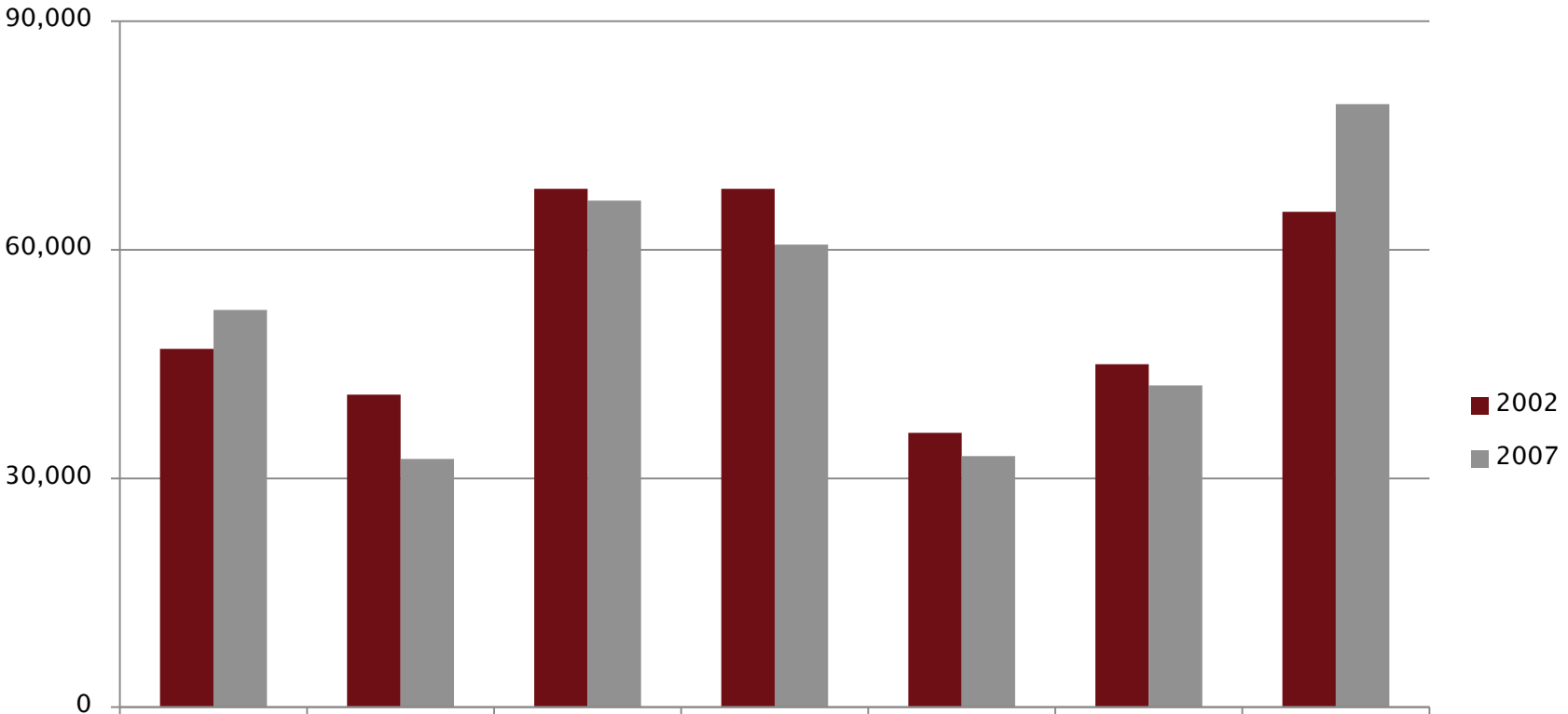
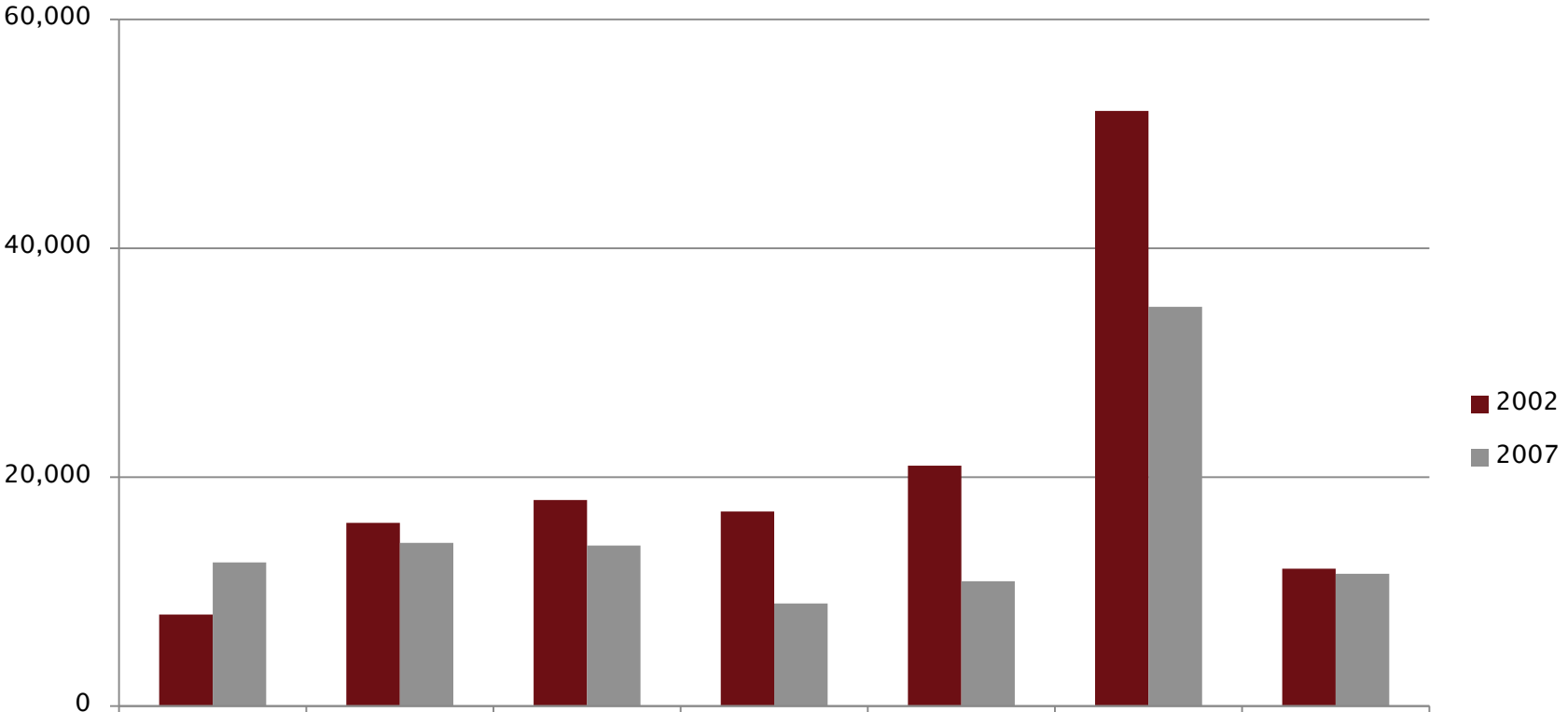
County Cattle and Calves Population



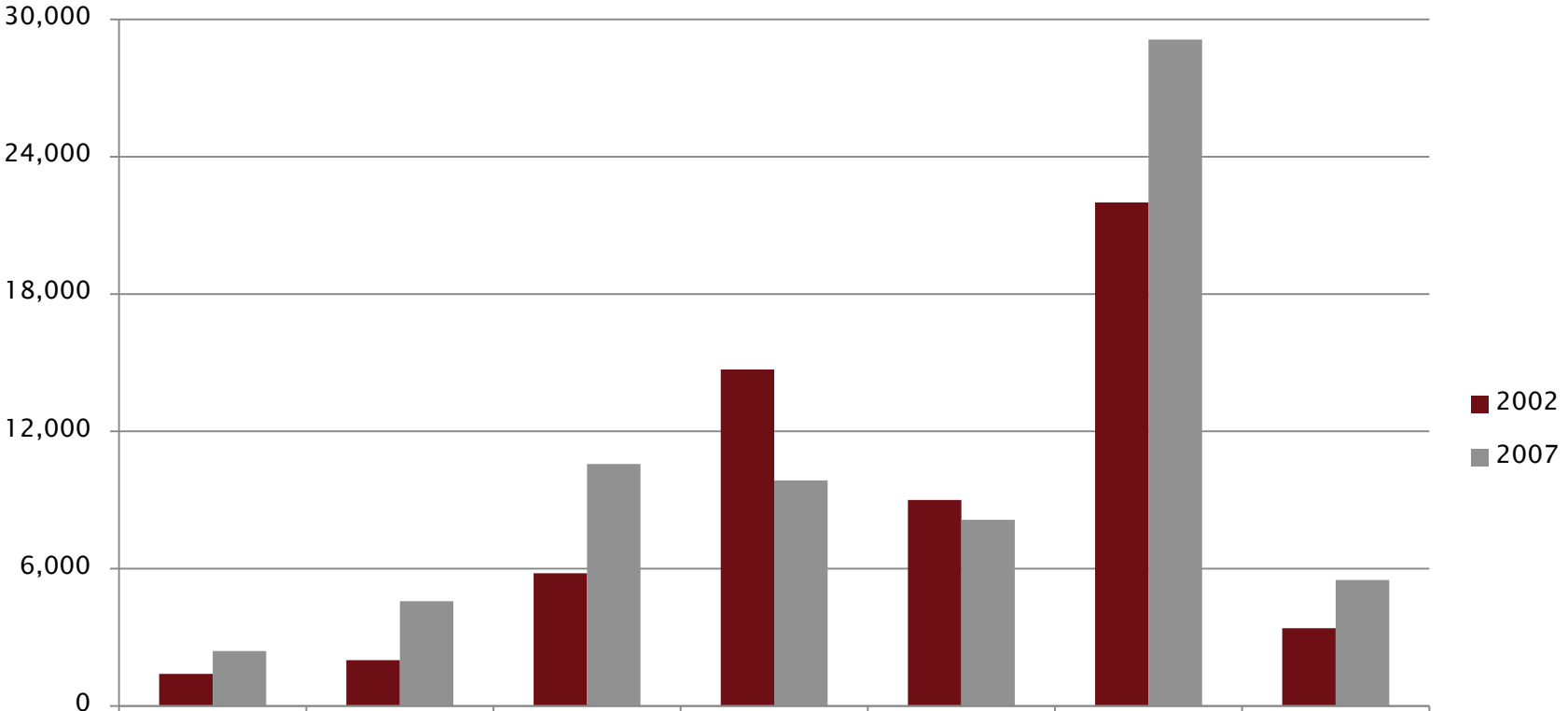
	Bell	Burnet	Coryell	Hamilton	Lampasas	Mills	Williamson
2002	47000	41000	68000	68000	36000	45000	65000
2007	52118	32575	66463	60688	32942	42223	79132

County Goat Population



	Bell	Burnet	Coryell	Hamilton	Lampasas	Mills	Williamson
2002	8000	16000	18000	17000	21000	52000	12000
2007	12547	14253	14023	8965	10901	34879	11550

County Sheep Population



	Bell	Burnet	Coryell	Hamilton	Lampasas	Mills	Williamson
2002	1400	2000	5800	14700	9000	22000	3400
2007	2400	4576	10571	9853	8133	29121	5504

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Stocking Rate Estimates

- Animal Units
  - 1 animal unit (AU) =
    - 1 cow/calf pair
    - 5 goats
    - 7 sheep
    - 0.5 horse (1 horse = 2 AU)
- From CEAs and NRCS – AU:Acres
  - Bell County =1:30 rangeland/pasture
  - Bell County =1:5 managed pasture
  - Lampasas County = 1:20 rangeland/pasture
  - Lampasas County = 1:18 managed pasture
  - Other Counties??

Appropriate Land Uses

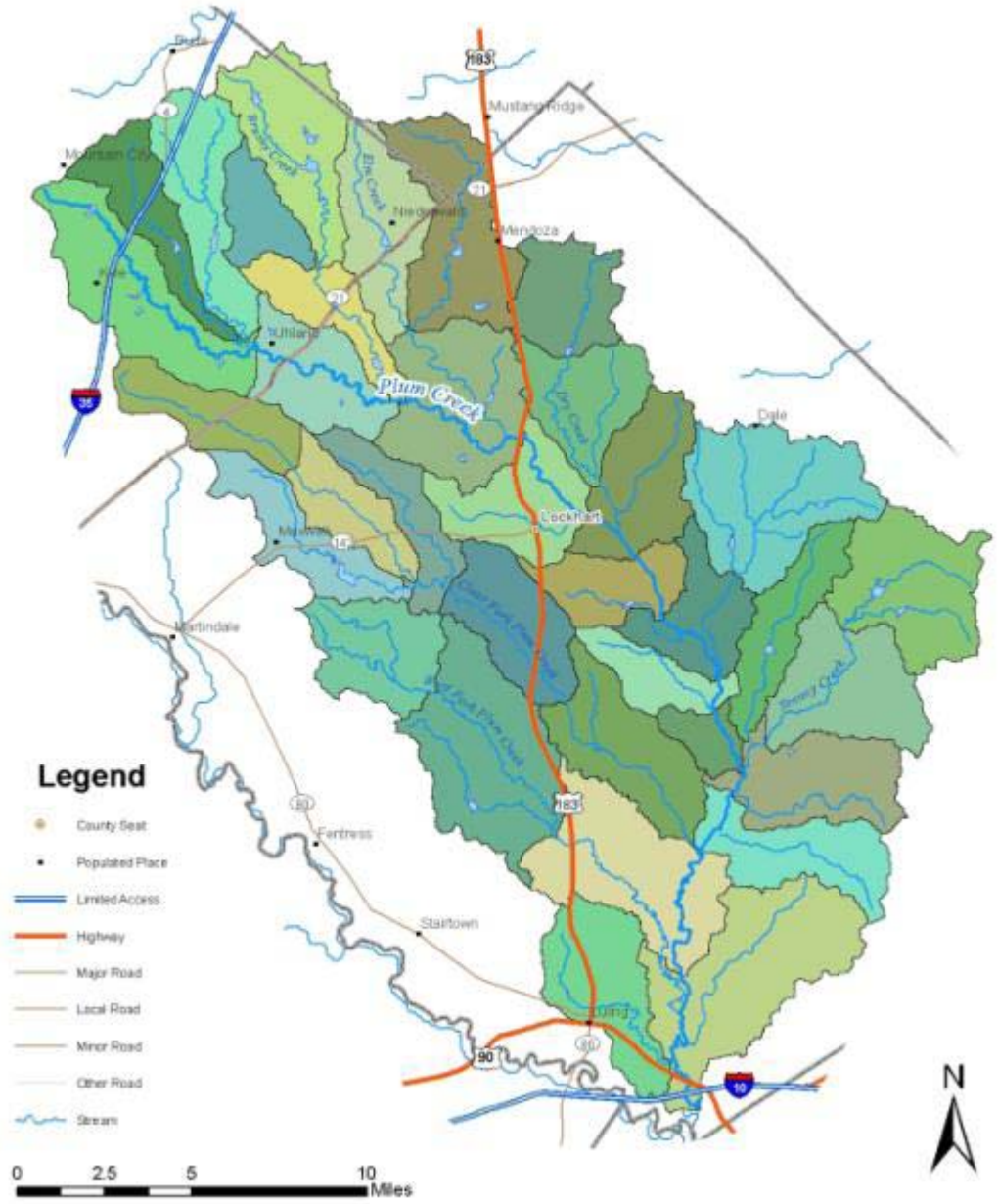
- What are the appropriate land uses to distribute livestock populations to?
  - Managed Pasture?
  - Rangeland/Pasture?
  - Forest?

Data Needed

- Crops planted; acres planted
- Cropping practices
  - Tillage
  - Fertilizer application rates
- Estimates of horse populations

Next Steps

Plum Creek Watershed



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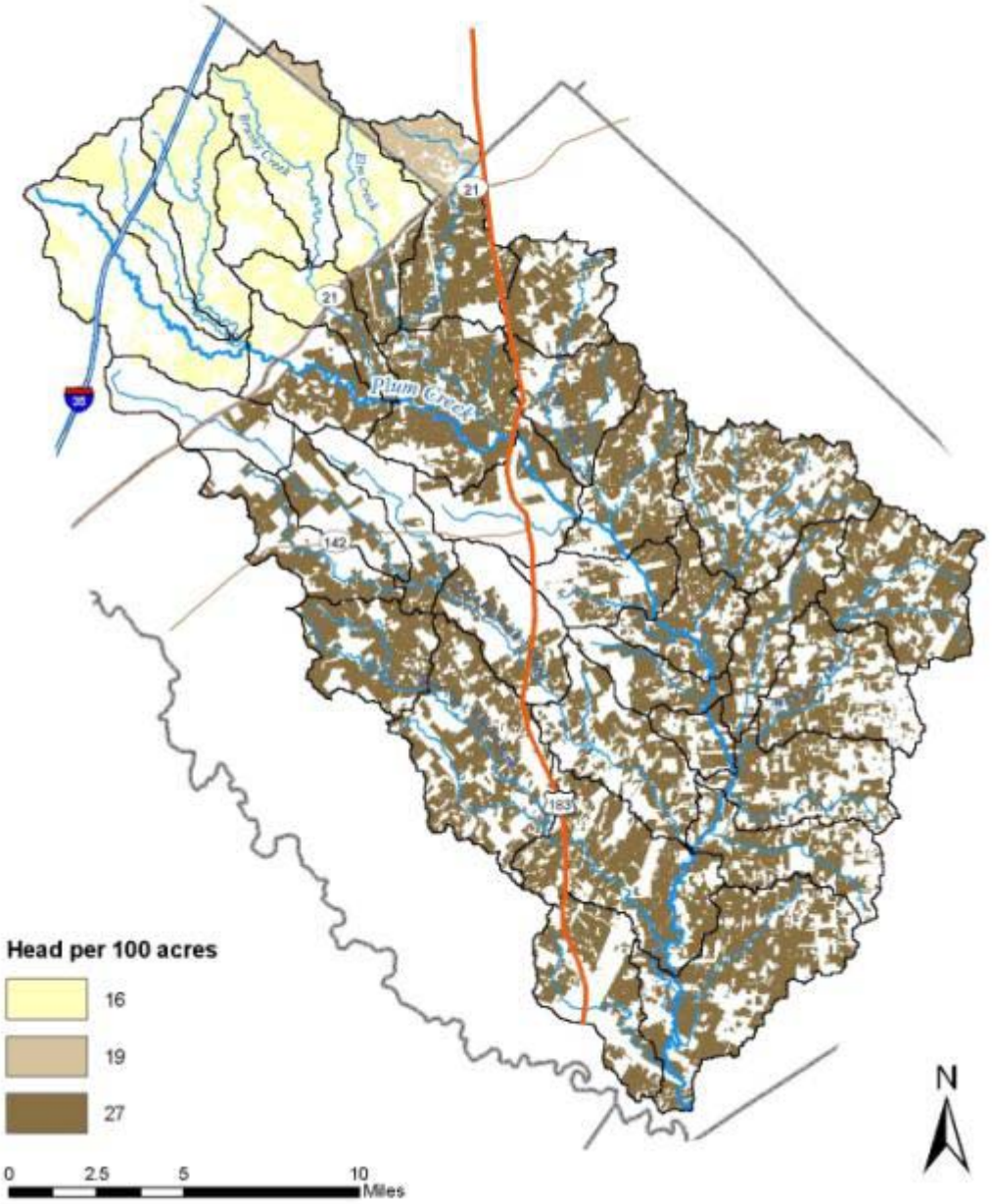
Plum Creek Texas Ag Statistics Cattle Numbers:

- Caldwell – 44,000
- Hays – 24,000
- Watershed – 30,866
- Livestock can be uniformly distributed to the supporting land areas
- The numbers then can be summed for each sub-watershed

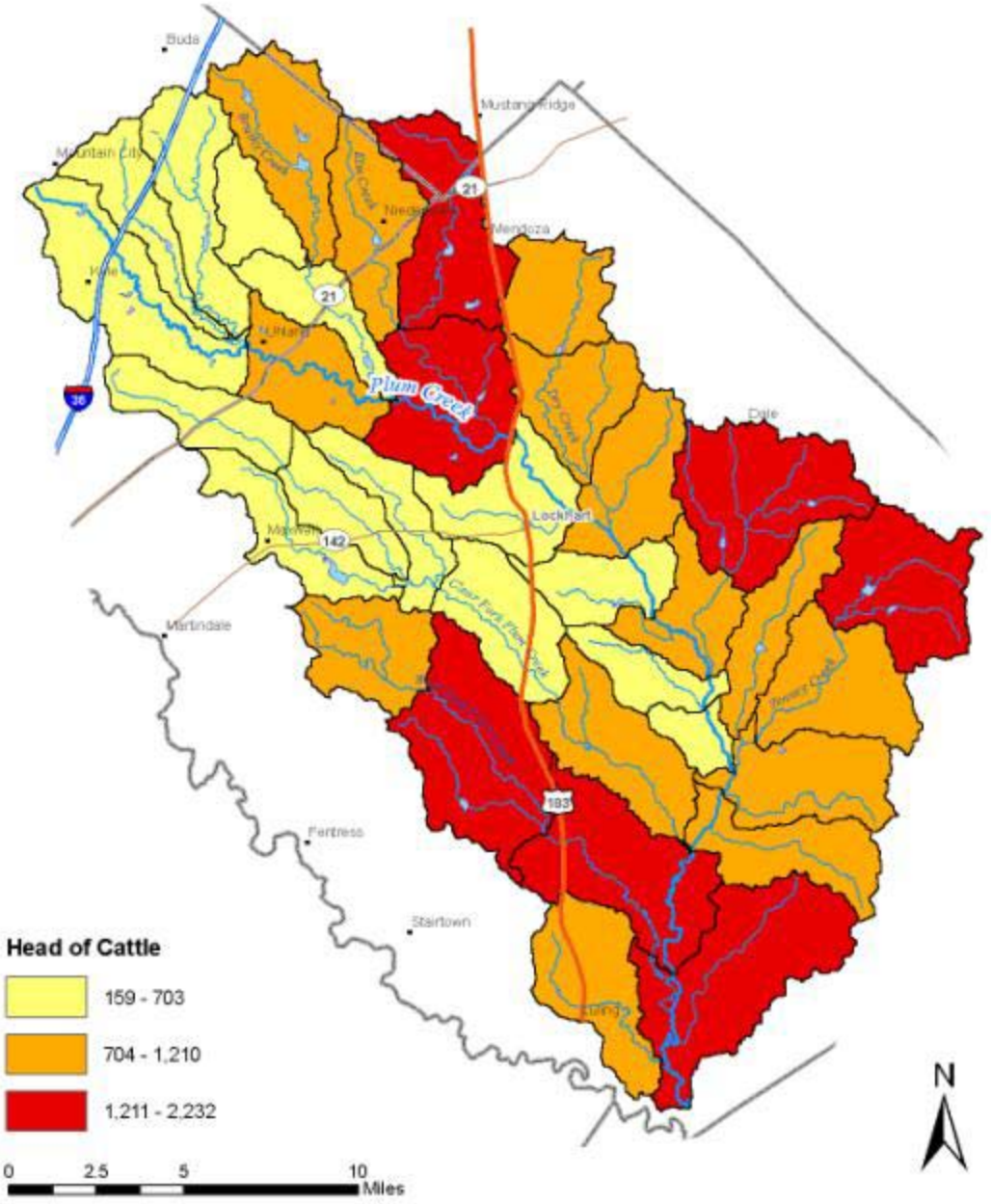
Cattle Distribution

Distribute cattle to appropriate land use



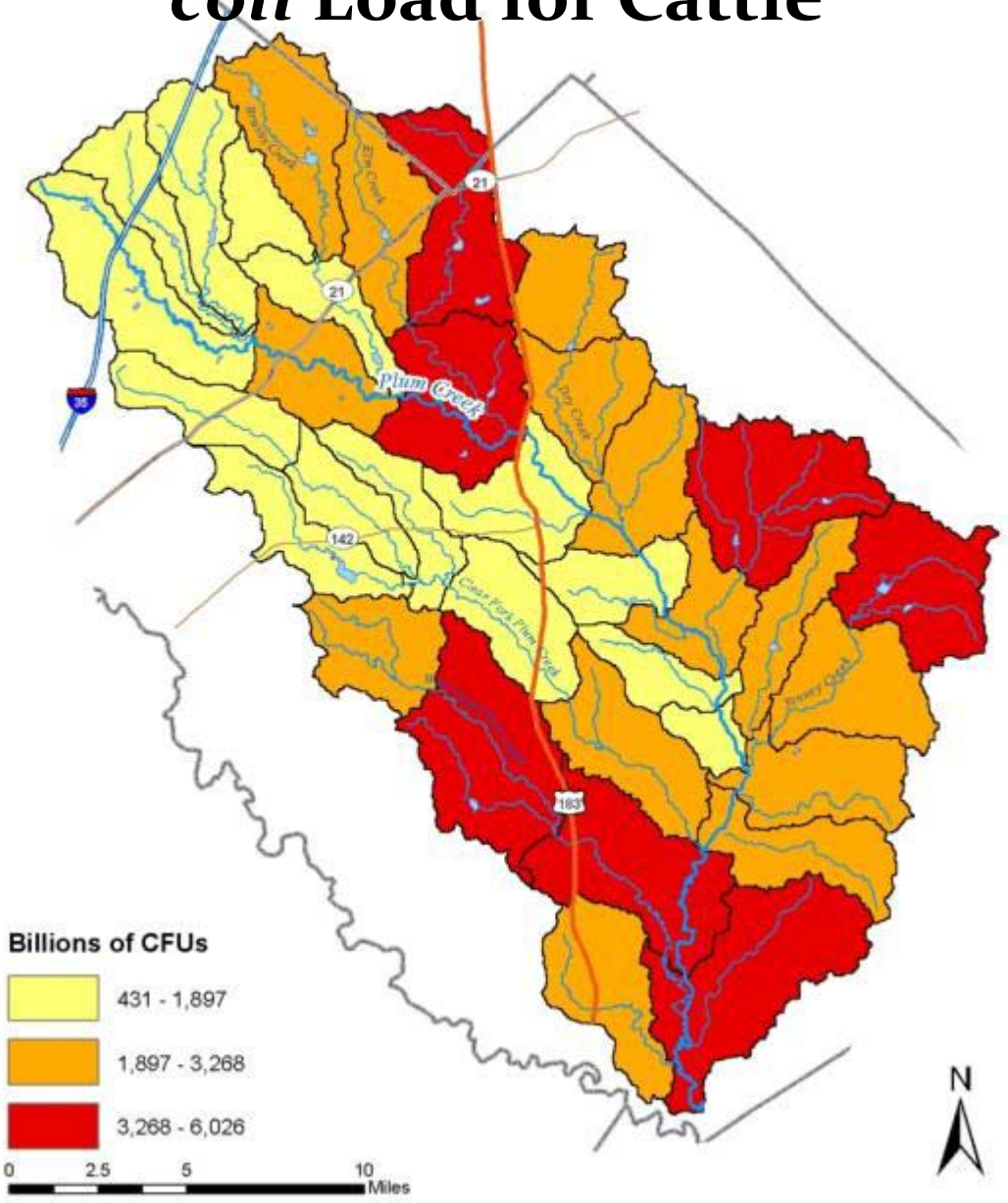
Cattle Density

Density is determined by adding the cattle populations within each subwatershed



Average Daily Potential *E. coli* Load for Cattle

Loading is determined by density in each subwatershed



Other Work Groups

- **Habitat and Wildlife Work Group**
  Monday, April 12th, 6 p.m. to 9 p.m.
  Lampasas County Farm Bureau
  1793 US Hwy 281
  Lampasas, TX 76550
- **Waste Water Infrastructure Work Group**
  Monday, April 19th, 2 p.m. to 5 p.m.
  Lampasas City Hall – Council Chambers
  405 South Main Street
  Lampasas, TX 76550
- **Agriculture Issues Work Group**
  Monday, April 19th, 6 p.m. to 9 p.m.
  Lampasas County Farm Bureau
  1793 US Hwy 281
  Lampasas, TX 76550
- **Outreach and Education Work Group**
  Tuesday, April 20th, 6 p.m. to 9 p.m.
  Lampasas City Hall – Council Chambers
  405 South Main Street
  Lampasas, TX 76550
- **Urban/Suburban Issues Work Group**
  Wednesday, April 21st, 2 p.m. to 5 p.m.
  City of Killeen -- Solid Waste Building
  2003 Little Nolan Road
  Killeen, TX 76542

These meetings are open to anyone interested, don't worry about whether you signed up or not. Please pass this info along to anyone else that might have interest or expertise to share.

May

- Does this date, time and location work for the group?
- If so, next meeting Monday, May 17
- Rainwater harvesting clinic:
  - Harker Heights Activity Center, Harker Heights
  - April 21-22
  - $150 pre-reg
  - $175 onsite reg
- My new phone number:
  - (254) 774-6008