

# Geronimo and Alligator Creeks Watershed Partnership Work Group Review

Steering Committee Meeting

May 11, 2010

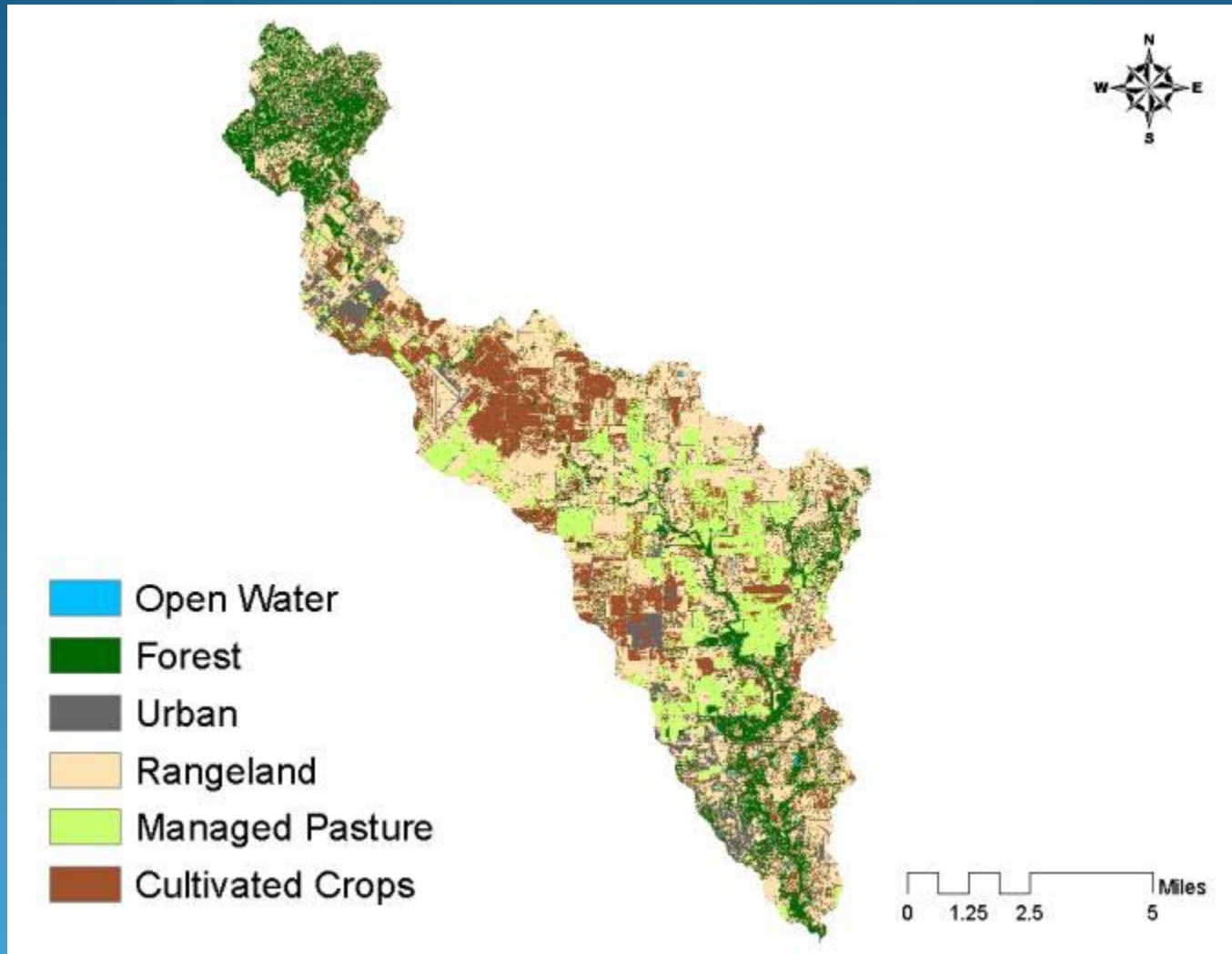
# Update from Work Group Meetings

- All three work groups have met twice during the months of March, April and May.
- Work groups have been reviewing data and discussing the specific causes and sources of nonpoint source pollution.
- Work groups reviewed and modified model inputs to accurately characterize the watershed.

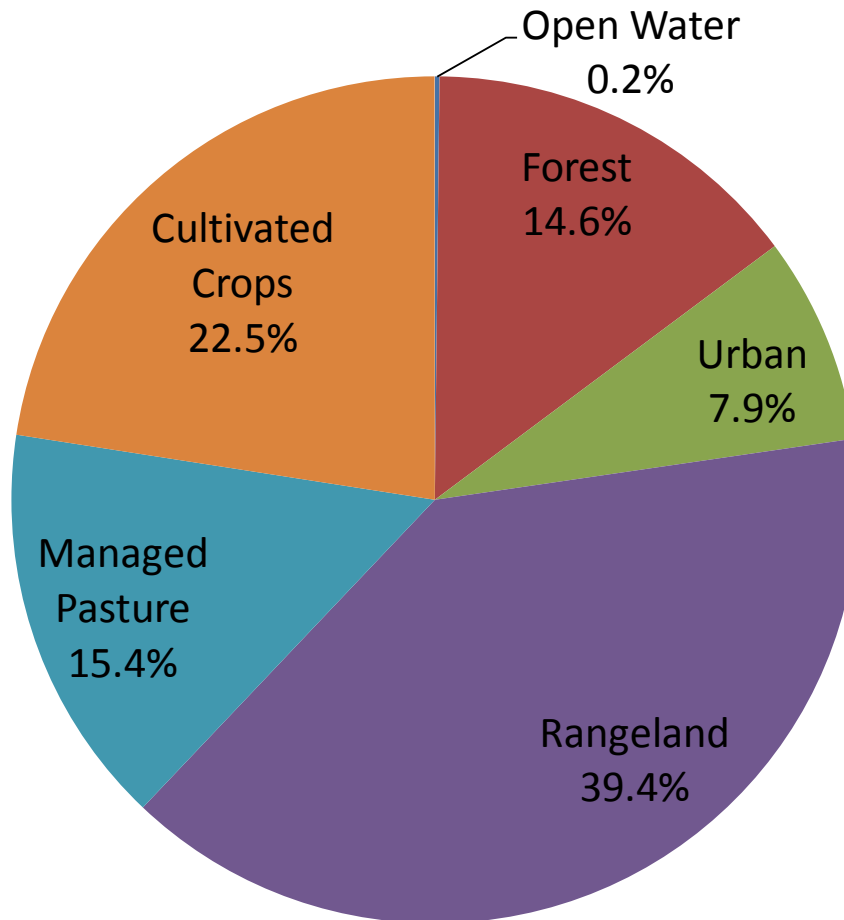
# Agricultural Work Group

- The purpose is to discuss the specific causes and sources of nonpoint source pollution stemming from general agricultural and silvicultural (forestry) sources.
- This includes cropland, pastureland, rangeland, and forestland. Sources to be discussed include runoff from cropland, livestock, wildlife and feral hogs (invasive species).
- This Work Group will also identify and recommend strategies to reduce and abate pollution from these sources.

# Watershed Land Use/Land Cover



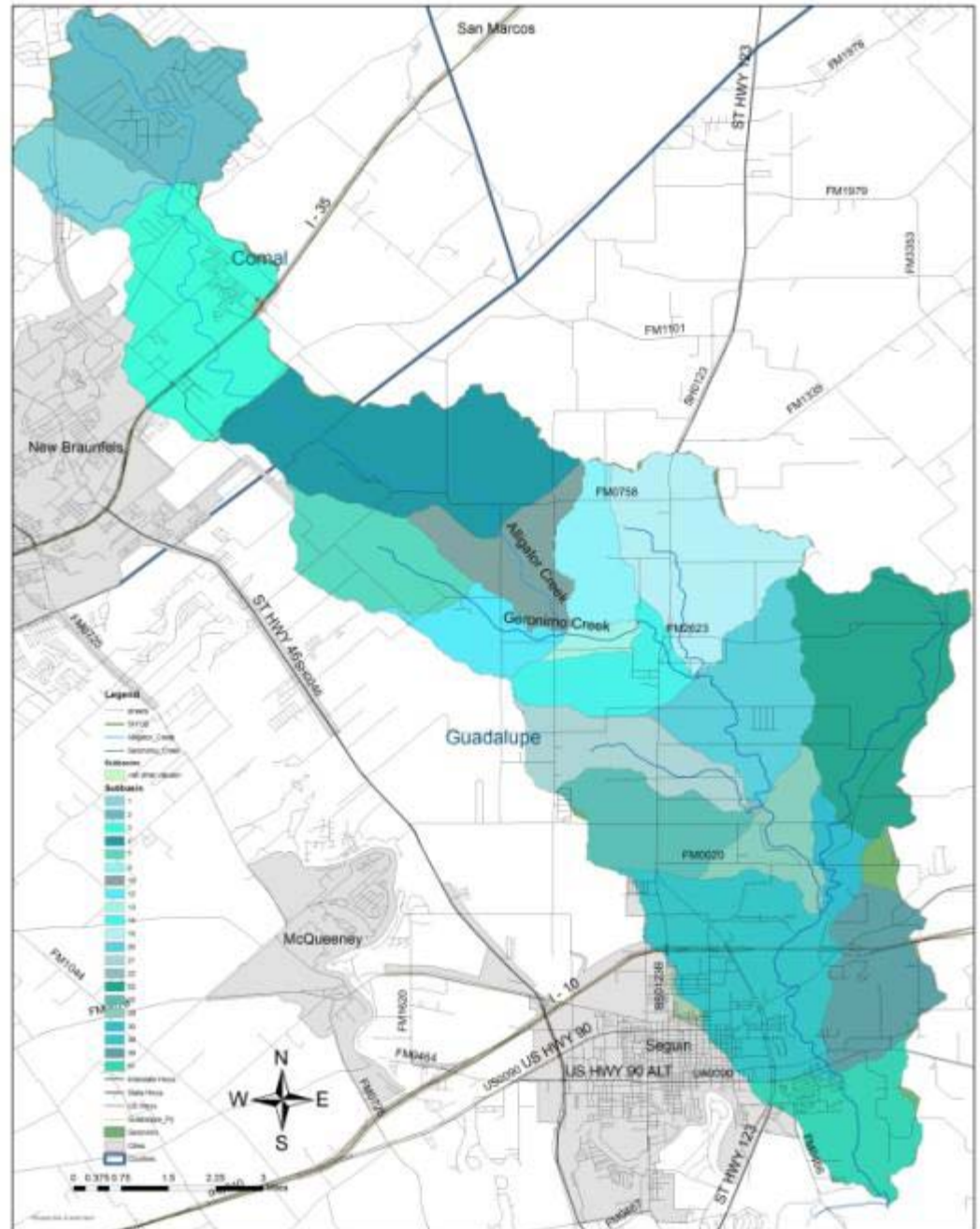
# Land Use Percentages



<u>Land Use</u>	<u>Acres</u>
<b>Total</b>	<b>41625</b>
<b>Rangeland</b>	<b>16397</b>
<b>Cultivated Crops</b>	<b>9381</b>
<b>Managed Pasture</b>	<b>6406</b>
<b>Forest</b>	<b>6088</b>
<b>Urban</b>	<b>3282</b>
<b>Open Water</b>	<b>72</b>

# 21 Subwatersheds

## Geronimo and Alligator Creeks Watershed



# Sources of Bacteria and Nitrogen with Data

- Feral hogs
- Livestock- cattle, goats, horses
- Deer
- Fertilizer application (cropland)



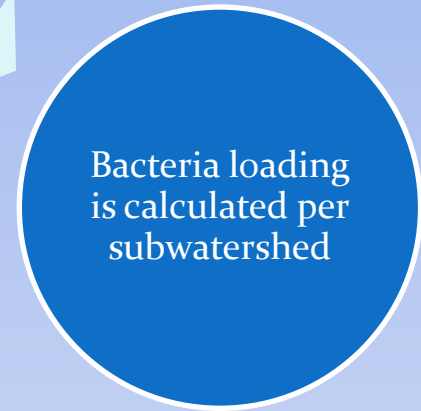
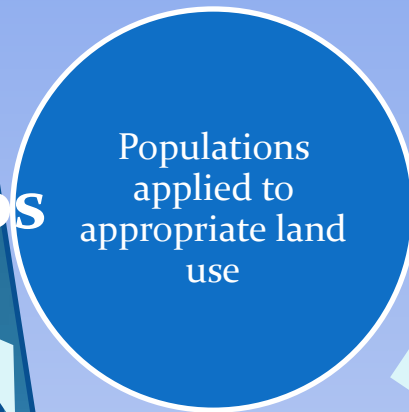
# SELECT - How does this tool work?

- Stakeholders estimate the populations of each source that may be contributing bacteria or nutrients
- Populations are then distributed across the watershed based on land use
- Pollutant loading from each source is estimated based on average amounts produced/released by the sources
- Subwatersheds with greatest potential can be identified



# Functions Of Work Groups

# Functions of SELECT



# Inputs Needed For SELECT

- Land use data
- Potential sources (feral hogs, livestock, wildlife, dogs, urban runoff, septic systems)
- Accurate estimates of populations (numbers) of each source
- Bacteria production rates in feral hogs, dogs, etc

# SELECT Inputs

- Agriculture Work Group
  - Feral hog populations
  - Livestock: cattle, horse and goat populations
  - Wildlife populations (deer)
- Urban Work Group
  - Pet populations
  - Urban runoff
- Wastewater Work Group
  - Septic systems
  - WWTF data

# Cattle Population Estimates

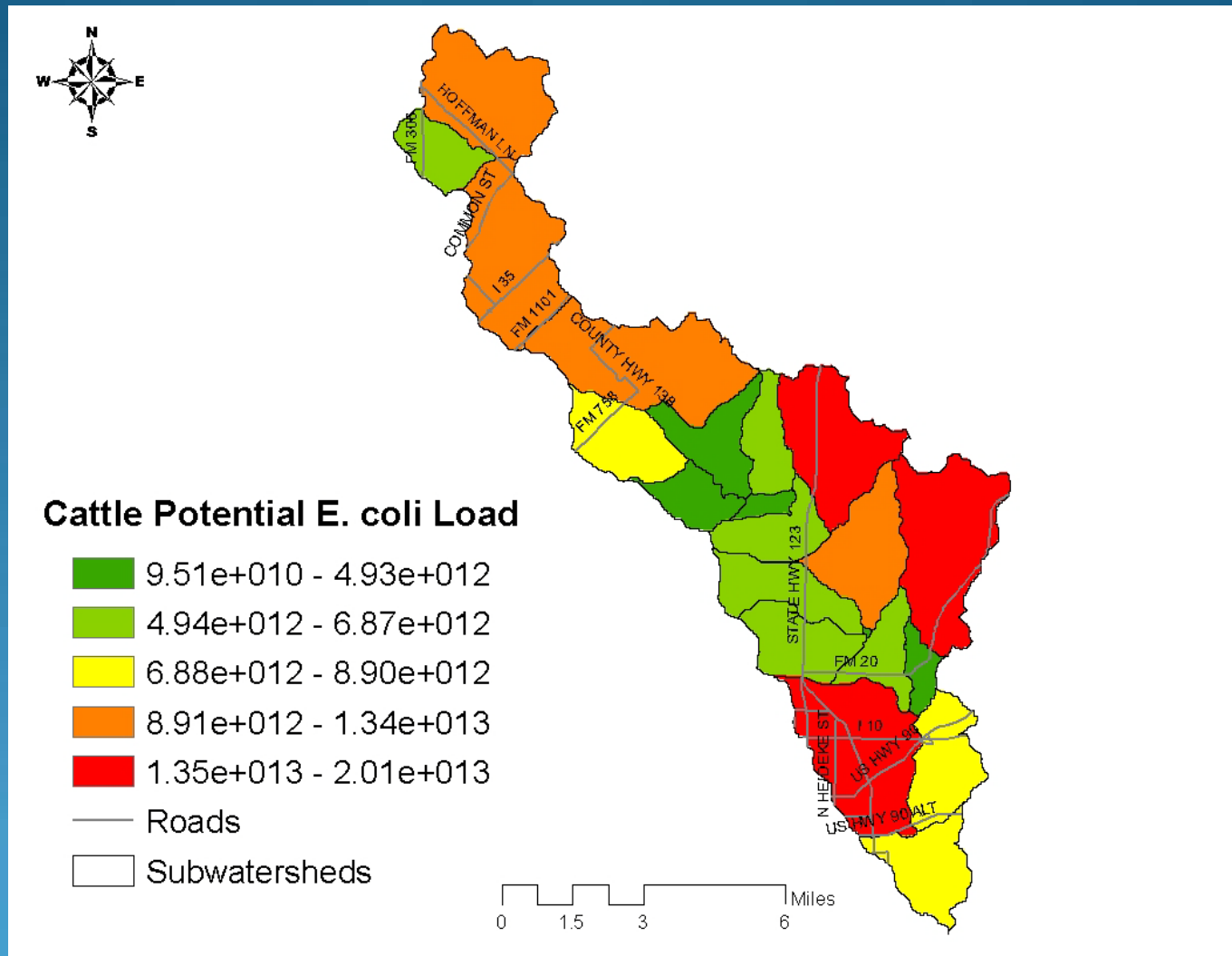
- Option 1: Density
  - Distribute cattle to appropriate land use categories (rangeland, forest)
  - Allocate 10 acres per head of cattle, based upon discussions with local NRCS and CEAs
  - Estimated population for the watershed is 2,248
- Option 2: NASS Population
  - USDA National Agricultural Statistics Service data
  - Take county populations and distribute to appropriate land uses
  - Estimated population for the watershed is 1,785

# Cattle

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- The Work Group chose:
  - Option 1: Based on Density
    - Selected 10 acres per animal
  - To distribute cattle to:
    - Rangeland
    - Forest
    - Managed Pasture
  
- Estimated Watershed Population: 2889

# Daily Potential *E. coli* loads resulting from Cattle



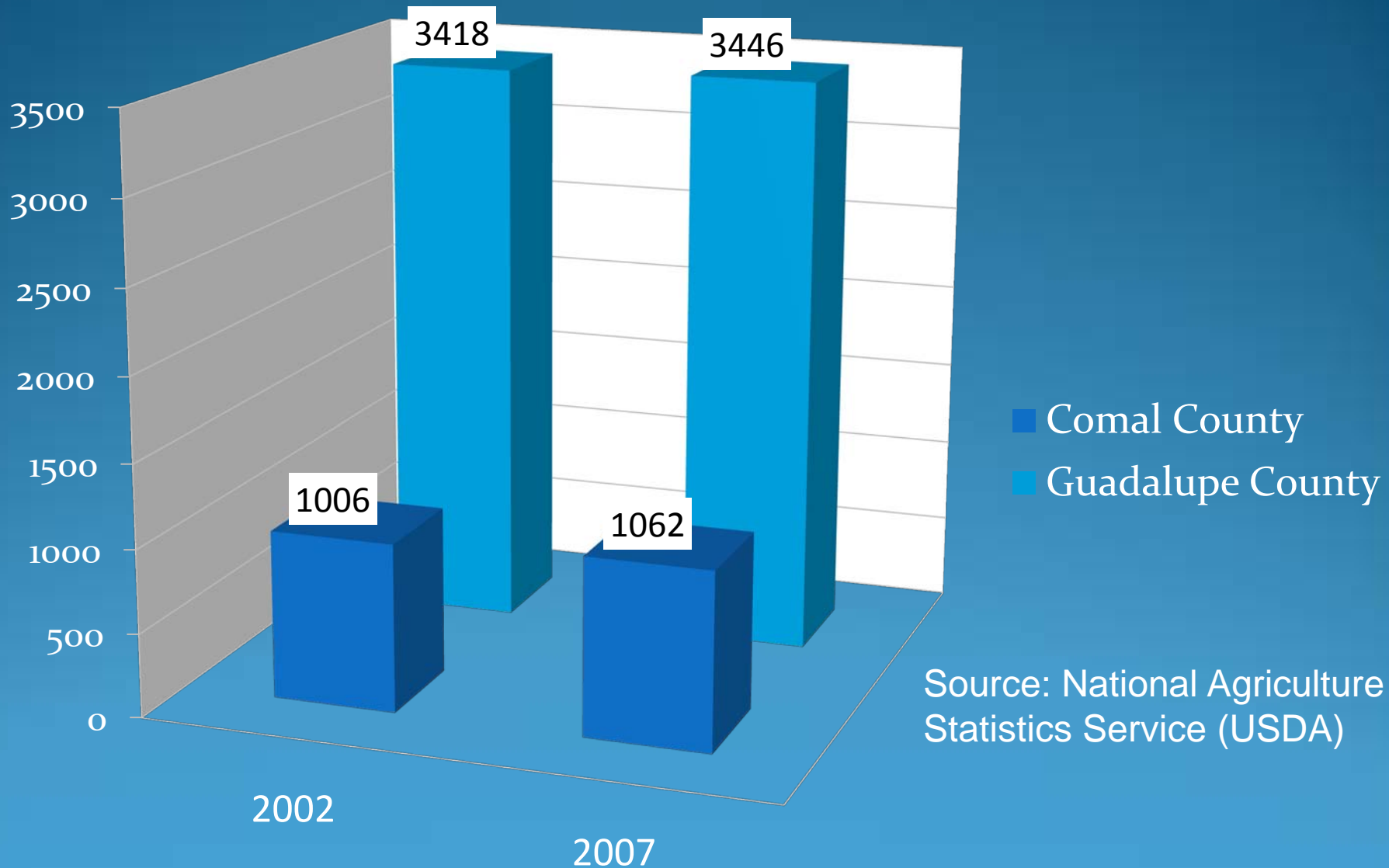
# Horses

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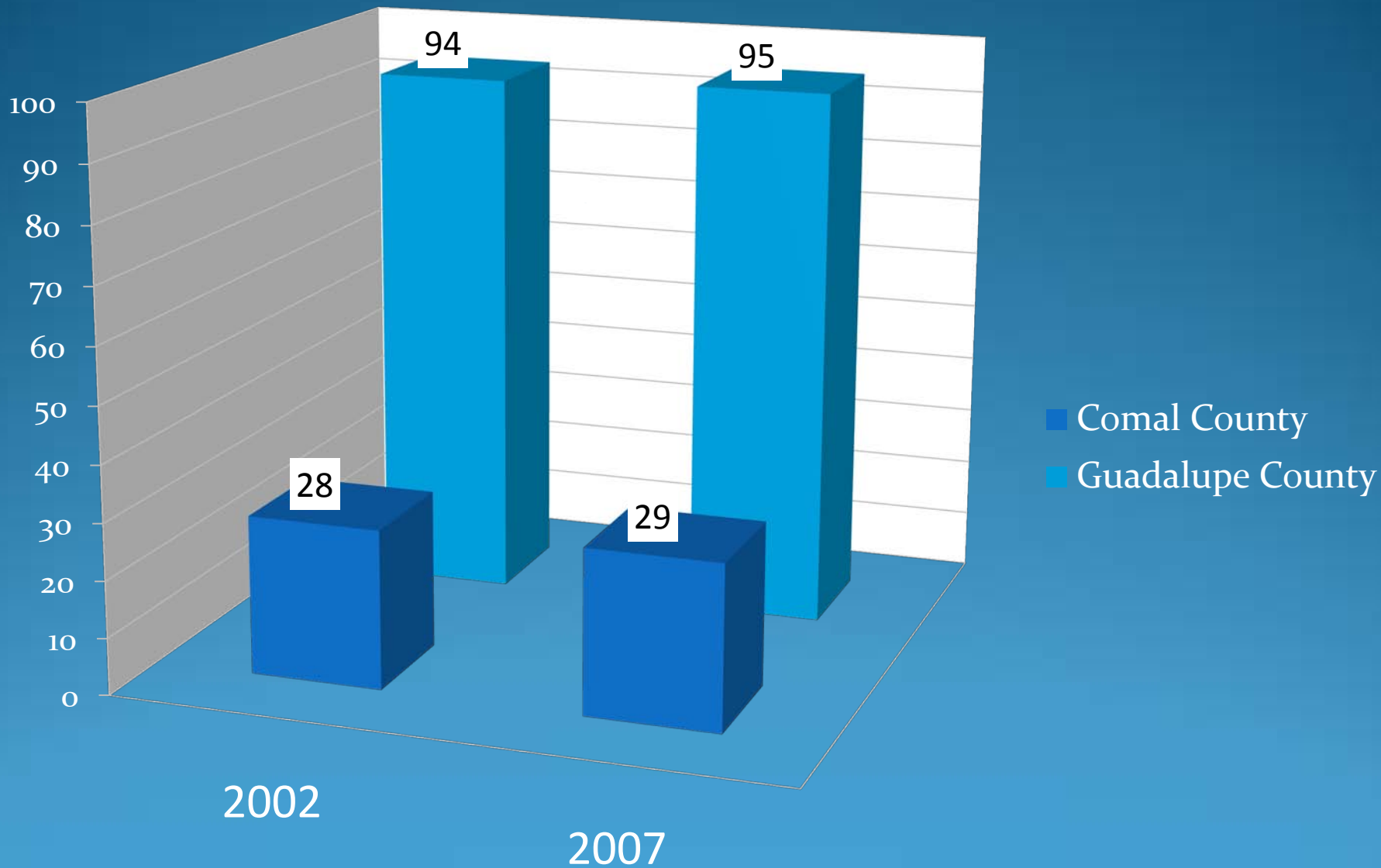
- Option 1 Density
  - Distribute to appropriate land use categories (rangeland, forest)
  - Estimated population for the watershed would be based on a selected density
- Option 2 NASS Population
  - USDA National Agricultural Statistics Service data
  - Take county populations and distribute to appropriate land uses
  - Estimated population for the watershed is 124



# Horses in Counties



# Horses in Watershed

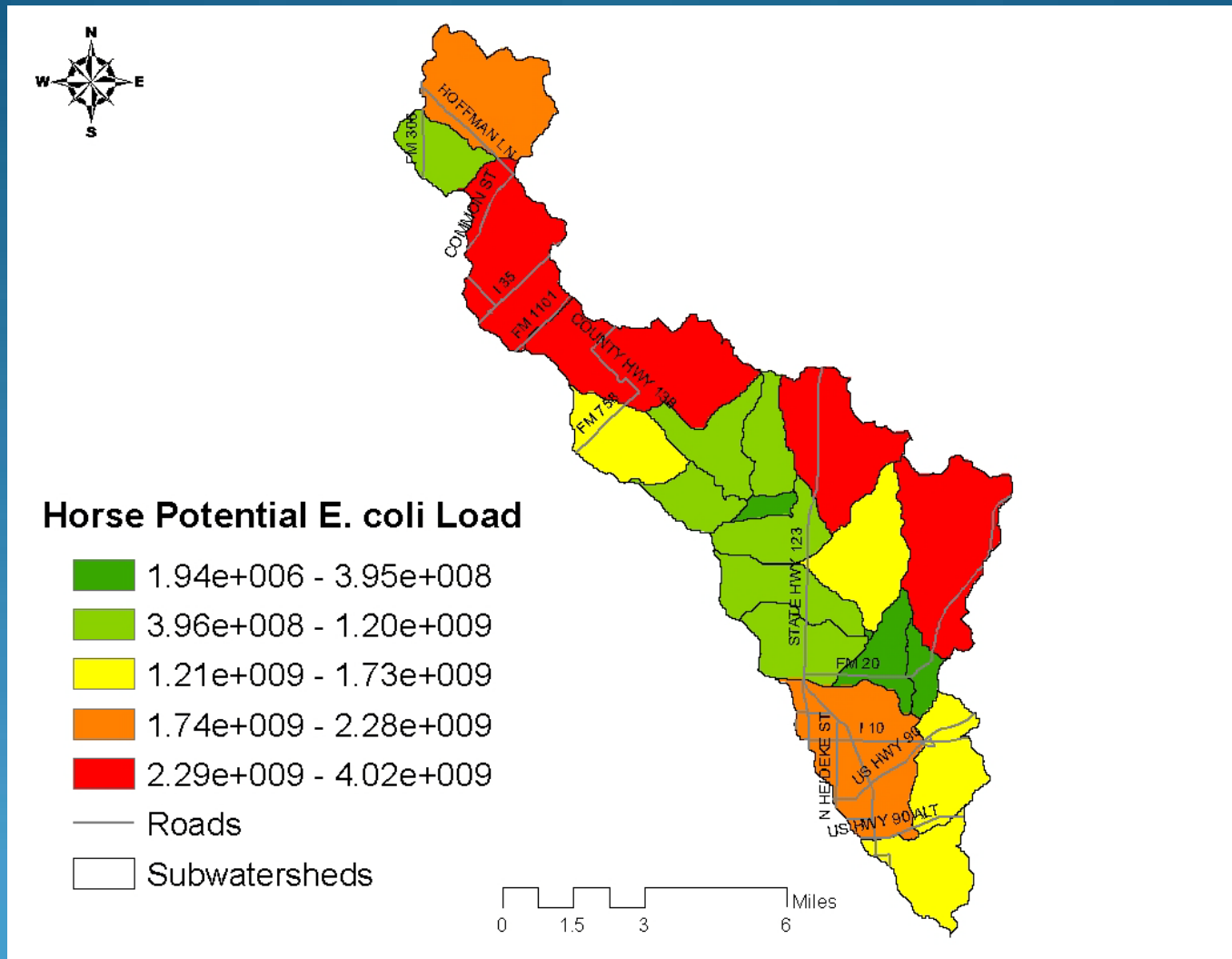


# Horses

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- The Work Group chose Option 2:
  - Use the NASS population as the basis for the estimate for the watershed
  - Results in a density of 132 acres per animal
  - Distribute horses to:
    - Rangeland
- Estimated Watershed Population: 124

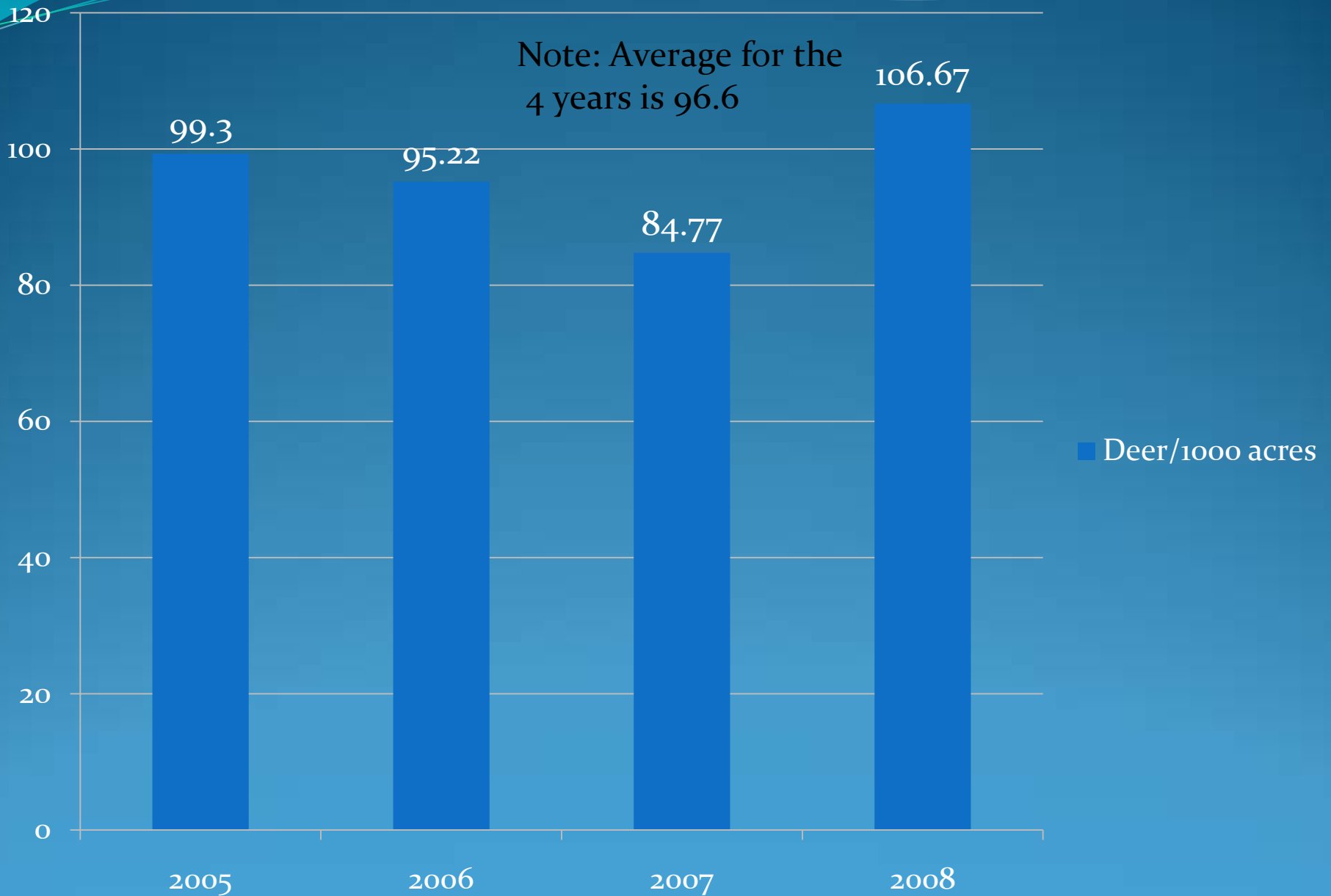
# Daily Potential *E. coli* loads resulting from Horses



# Deer Population Estimates

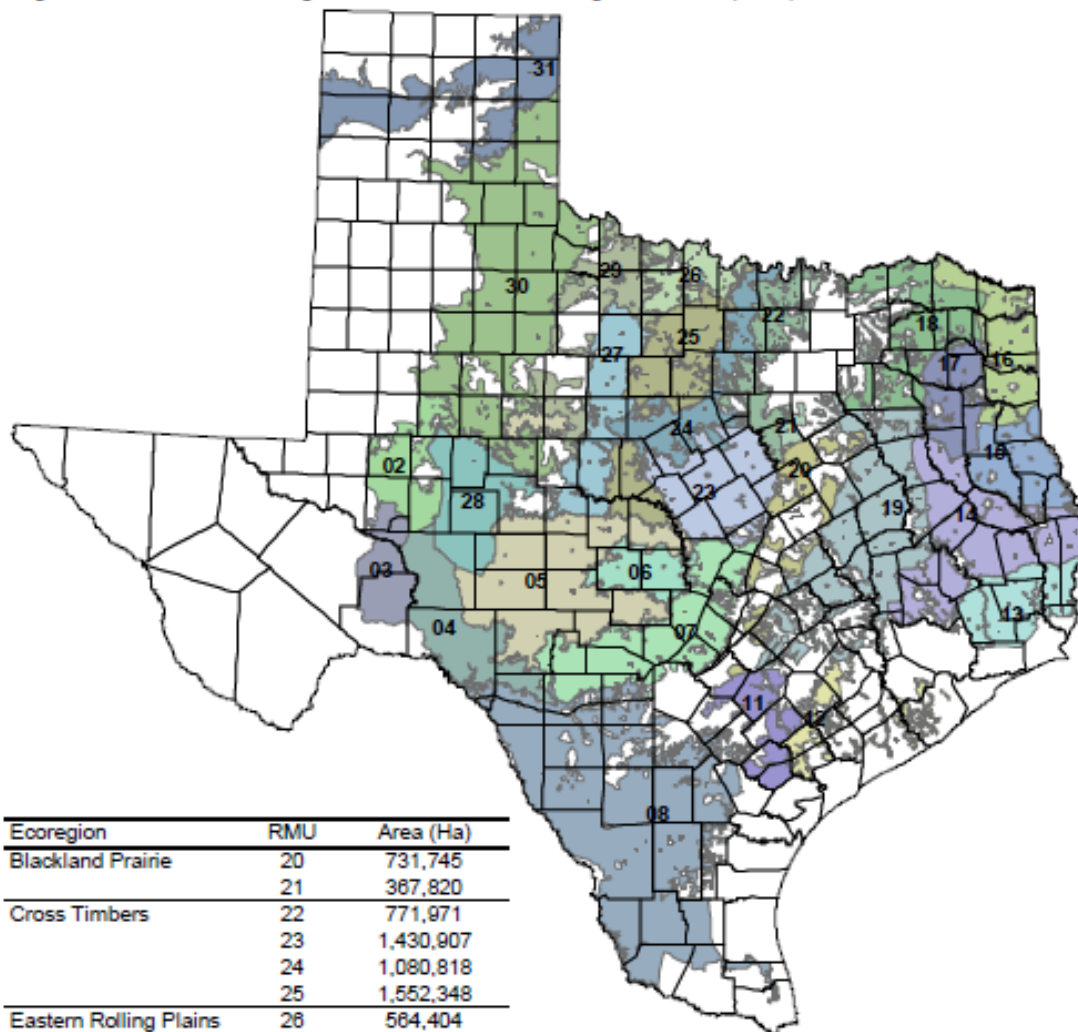
- Estimate was provided by TPWD deer census information (Lockwood, 2008)
- Allocate about 10 acres per deer
  - 2005 to 2008: 99.8 deer, 95.2 deer, 84.7 deer, and 106.7 deer/1000 acres
  - Average is 96.6 deer/1000 acres
- Estimated population for the watershed 2,172
- Distribute deer to appropriate landuse categories

# Estimated Whitetail Deer Population



# Monitored Deer ranges within the Resource Management Units of Texas

Figure 1. Monitored deer range within the Resource Management Units (RMU) of Texas.

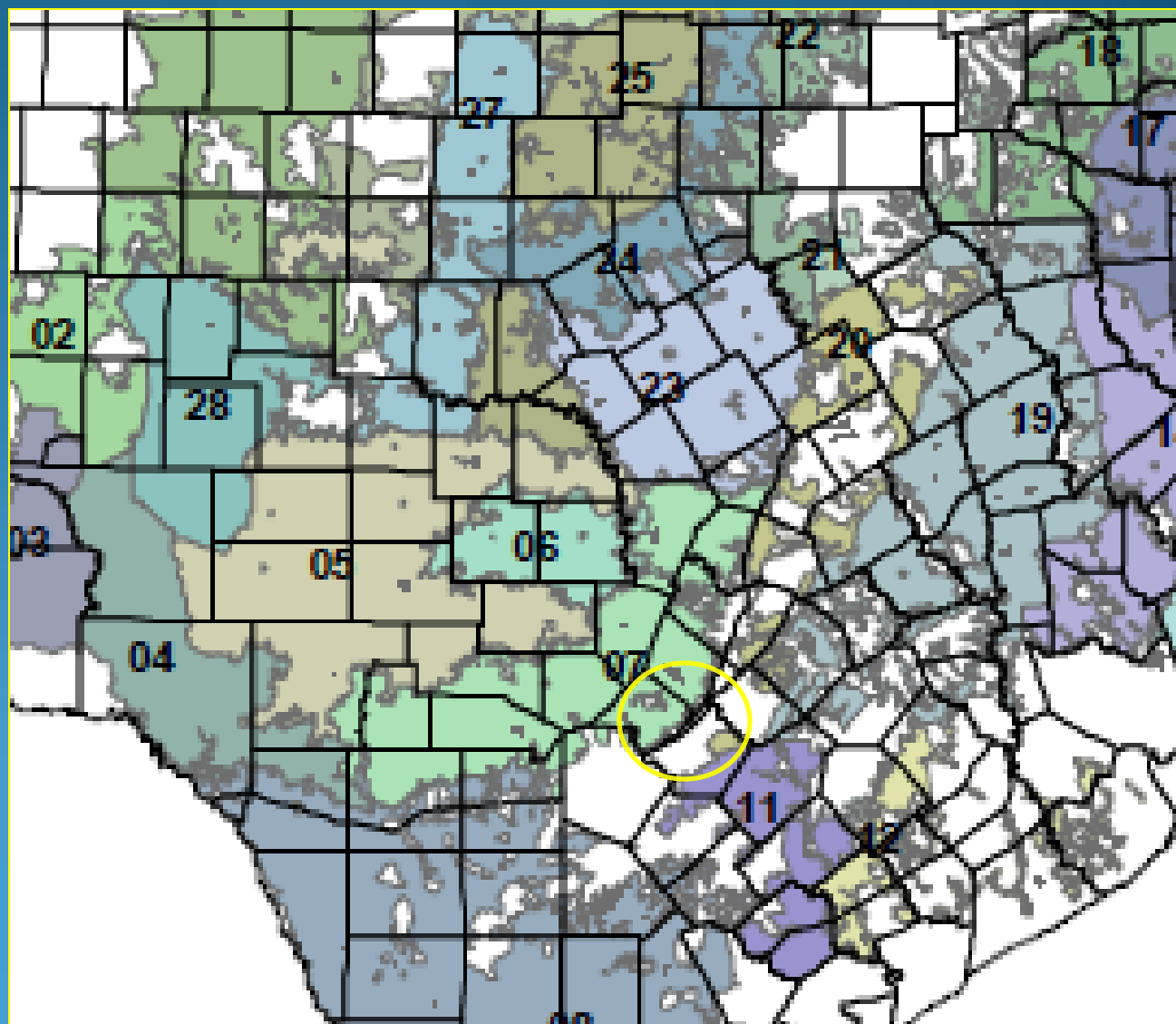


Ecoregion	RMU	Area (Ha)
Blackland Prairie	20	731,745
	21	387,820
Cross Timbers	22	771,971
	23	1,430,907
	24	1,080,818
	25	1,552,348
Eastern Rolling Plains	26	564,404
	27	1,162,939
	29	1,091,385
Edwards Plateau	4	1,308,326
	5	2,807,841
	6	583,685
	7	1,909,010
	28	1,248,008
Pineywoods	13	949,342
	14	1,755,050
	15	862,622
	16	1,056,147
	17	735,592
	18	1,290,491

Ecoregion	RMU	Area (Ha)
Post Oak Savannah	11	690,618
	12	475,323
	18	1,290,491
	19	2,528,747
South Texas Plains	8	5,255,676
Southern High Plains	2	810,505
TransPecos	3	693,080
Western Rolling Plains	30	4,223,231
	31	1,622,158
<b>Total</b>		<b>39,557,788</b>



# Watershed Area

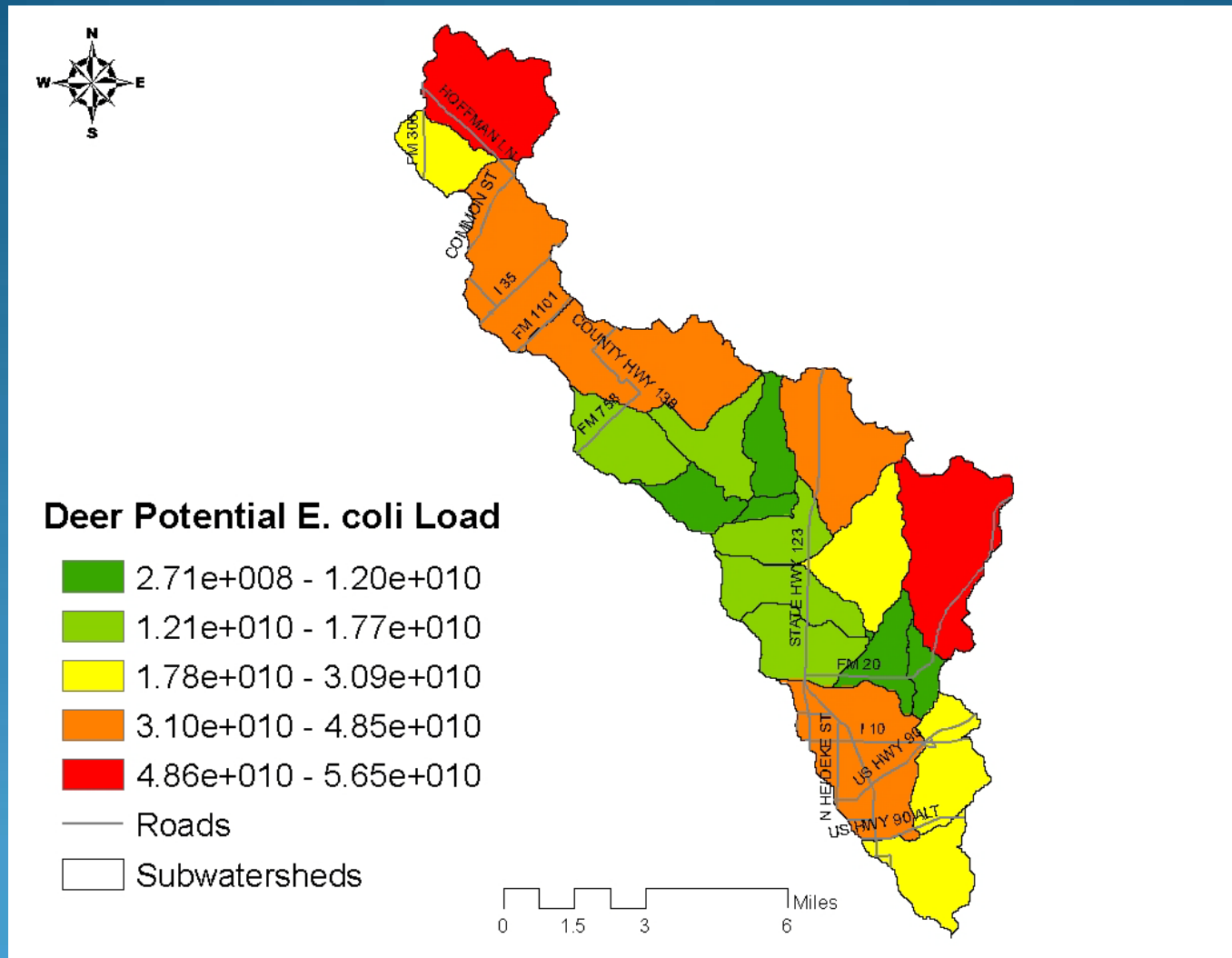


# White-Tailed Deer

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- The Work Group chose to:
  - Use the TPWD estimate
    - Average of the previous 4 years
    - Density of 10 acres per animal
  - Distribute them to:
    - Forest
    - Rangeland
- Estimated Watershed Population: 2172

# Daily Potential *E. coli* loads resulting from Deer



# Feral Hogs

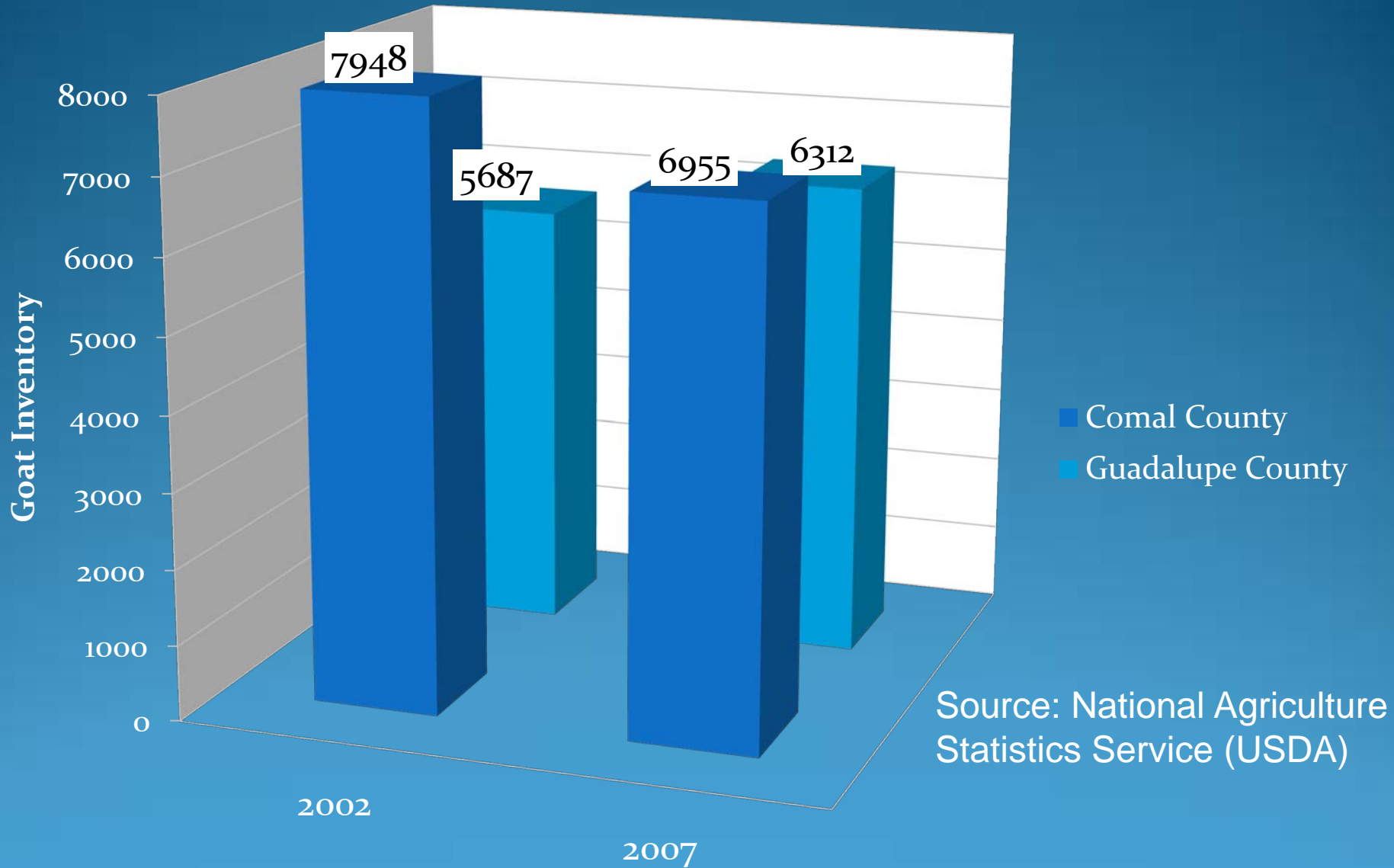
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- The Work Group chose to:
  - Distribute feral hogs to all land uses except for urban and open water
  - SELECT then concentrates those populations to riparian corridors
  - 25 animals per square mile (1 animal per 26 acres)
- Estimated watershed population: 1626
- Modifications to SELECT are currently underway

# Goat Population Estimates

- Option 1: Density
  - Conversations with producers and County Extension Agents estimate the goat population at about 550 in the watershed
- Option 2: NASS Population
  - USDA National Agricultural Statistics Service data
  - Take county populations and distribute to appropriate land uses
  - Estimated population for the watershed is 364

# County Goat Populations



# Goats

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- The Work Group chose to:
  - Locate 150 in Subwatershed 4
  - Locate 300 in Subwatershed 10
  - 100 spread across Subwatersheds 1, 2, and 3
  - 200 evenly distributed around entire watershed
  - Land use
    - Rangeland
    - Forest
    - Managed pasture
- Estimated Watershed Population: 750
- Modifications to SELECT are currently underway



# Next Steps

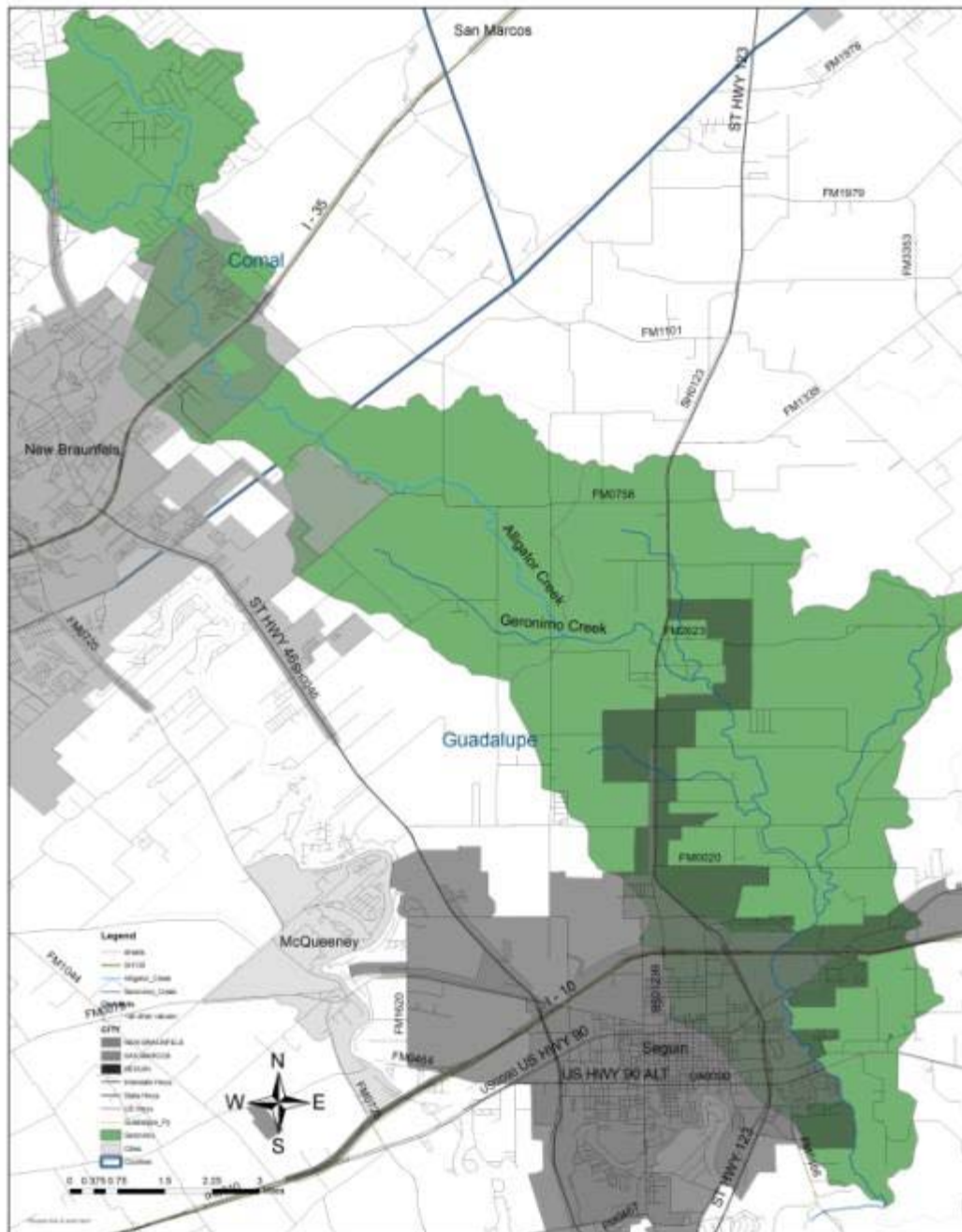
- Modifications are being made to SELECT to reflect the latest round of meeting discussions and recommendations to the Steering Committee
- Begin discussions of possible BMPs and available programs to assist producers

# Urban Work Group

- The purpose of this Work Group is to discuss the specific causes and sources of nonpoint source pollution stemming from general urban sources
- This includes residential, commercial, and industrial land uses
- Sources to be discussed include runoff from paved surfaces, pets and other non-livestock domestic species
- Urban growth and development is a topic within the realm of this Work Group

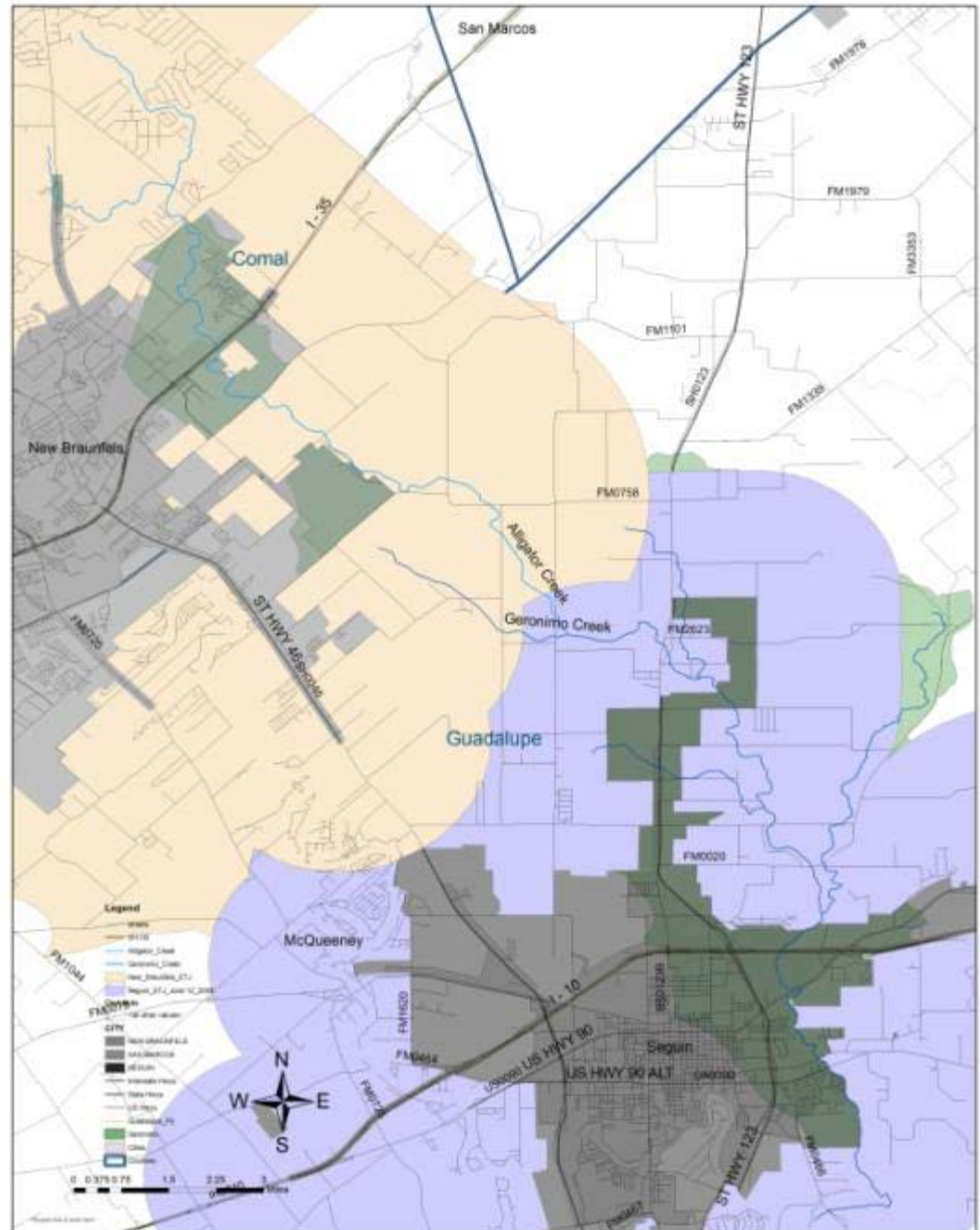
# City Limits

## Geronimo and Alligator Creeks Watershed



# Extra Territorial Jurisdictions (ETJ)

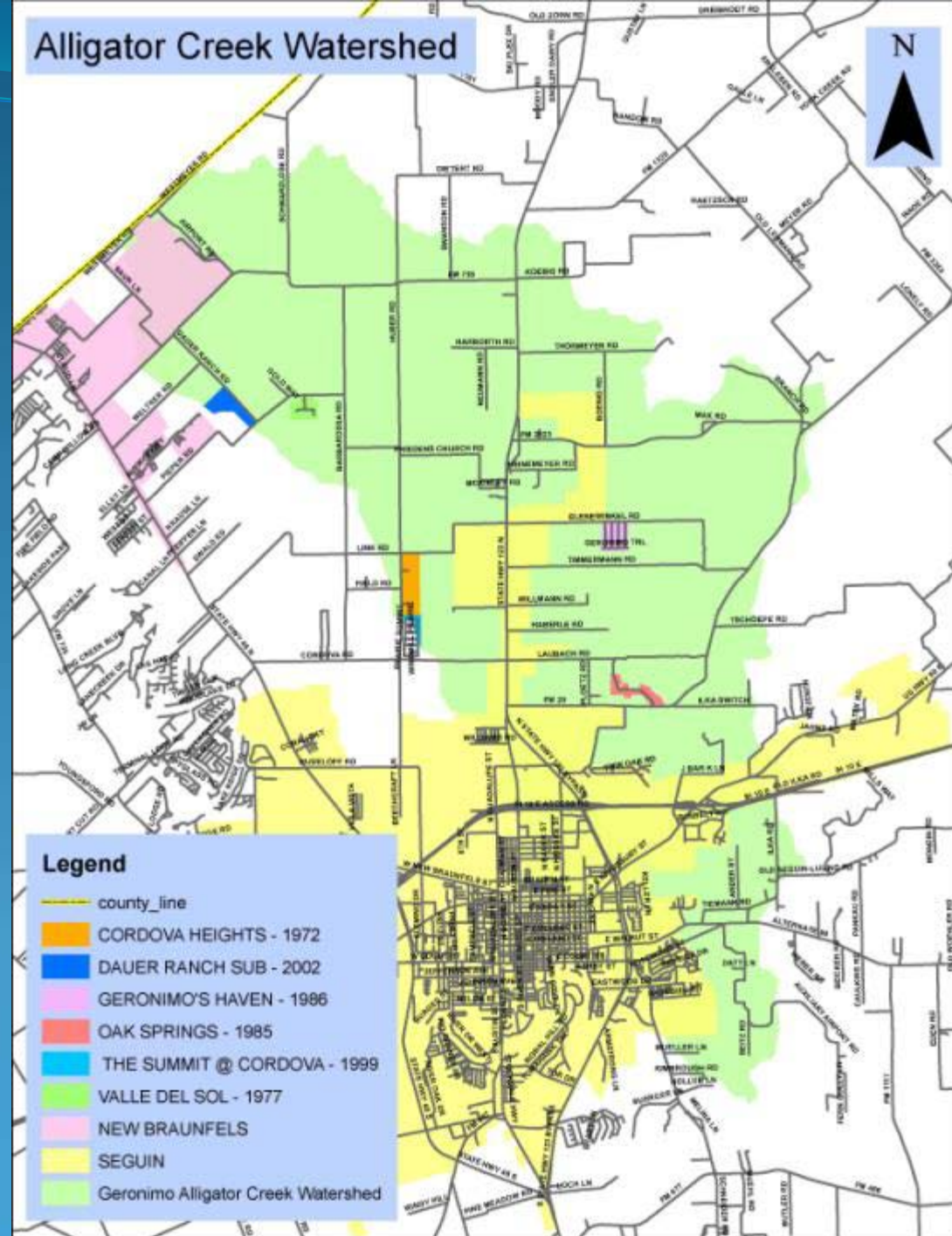
## Geronimo and Alligator Creeks Watershed





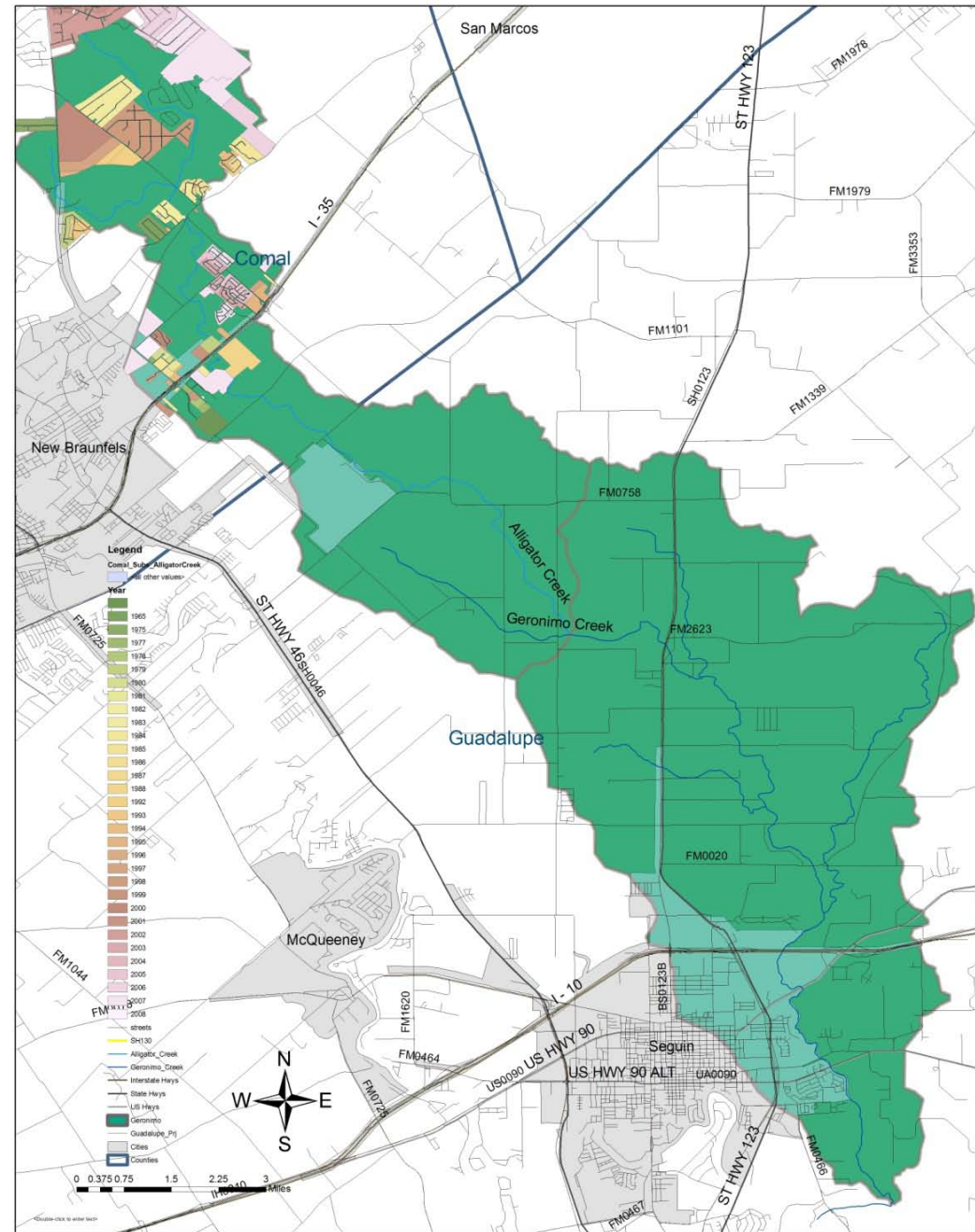
# Subdivisions in Guadalupe County

## Alligator Creek Watershed



# Subdivisions in Comal County

## Geronimo and Alligator Creeks Watershed Comal County Subdivisions



# 2000 Census Estimates for the Watershed

- Population in watershed in Guadalupe County : 10,029
- Population in watershed in Comal County : 3,125
- Households in watershed in Comal County: 1,075
- Households in watershed in Guadalupe County: 3,558
- New Braunfels Population in 2000 was 36,494 in July 2008: 53,547. Population change since 2000: +46.7%
- Seguin Population in 2000 was 22,011 in July 2008: 26,394. Population change since 2000: +19.9%



# Sources of Bacteria with Data

- Urban Stormwater/ runoff
- Pets – Dogs

# Dog Population Research

- Contacted cities of Seguin and New Braunfels and Comal and Guadalupe Counties to get the number of dogs registered annually through Animal Control
- Contacted local vets to get their estimate of the dog populations
- Looked at American Veterinarian Medical Association (AVMA) estimate methods –both national average and state average

# Dog Population Estimate Method

- Options
  - Use the AVMA 2008 National estimate of 0.63 dogs/household
  - Use the AVMA 2002 Texas estimate of 0.8 dogs/household
  - Use a different estimate method
  - Based on input from the March meeting, the 0.8 dog/household estimate was utilized in the preliminary model run
  - Based on discussions from April and with local veterinarian information it was decided to use 1 dog/household

# Dog Population Estimate Selected

The Work Group decided to use an estimate of 1.0 dog per household

Modifications to SELECT are currently underway

# Urban Runoff

- Utilize PBS&J report to determine average concentration of bacteria in urban runoff
- Use historical rainfall amounts to determine average volume
- Delineate the urban areas where this type of runoff will occur

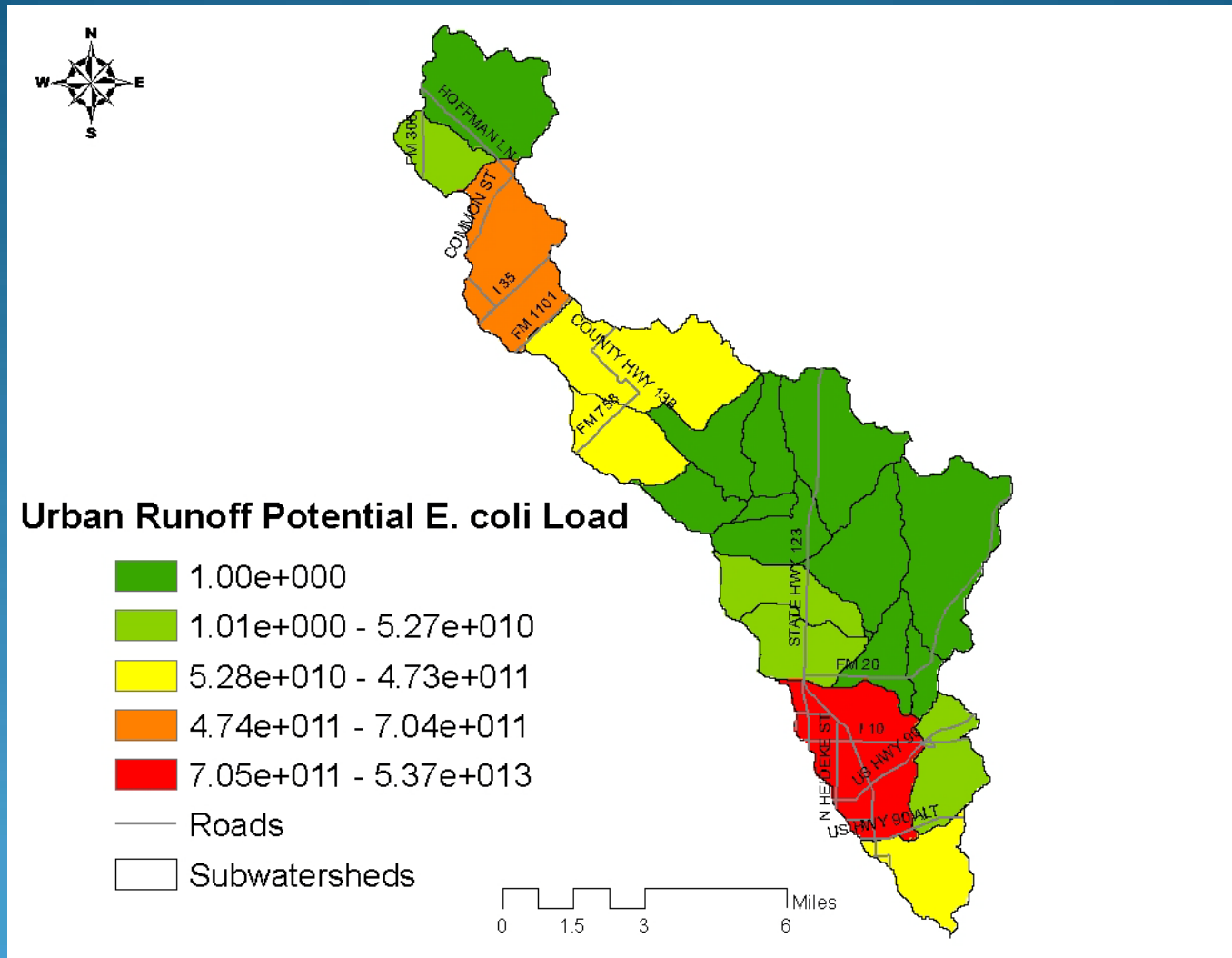
# Urban Runoff

- Curve Number Approach

- Assume all urban areas have a curve number of 1
  - Most precipitation runs off the surface
  - Cropland is in the range of 0.75
- Precipitation = based on annual average daily rainfall
- Runoff Volume = Precipitation \* Urban Area
- E. coli Load = Runoff volume \* E. coli concentration

**Bacteria load = runoff volume \* concentration**

# Daily Potential *E. coli* loads resulting from Urban Runoff



# Next Steps

- Modifications are being made to SELECT to reflect the latest round of meeting discussions and recommendations to the Steering Committee
- Begin discussions of possible BMPs and available programs to cities/counties

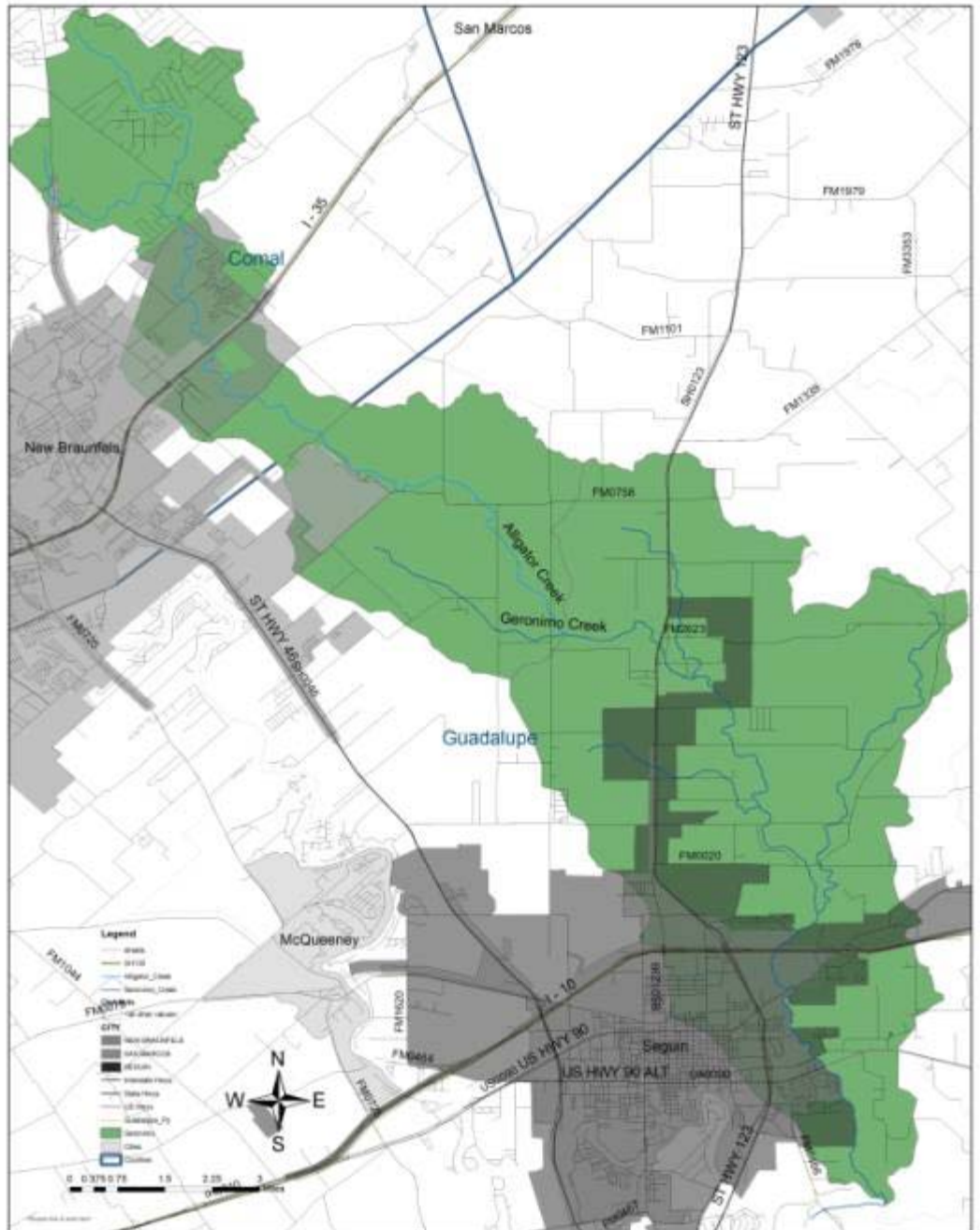


# Wastewater Work Group

- The purpose of this Work Group is to discuss the specific causes and sources of pollution stemming from wastewater sources.
- Wastewater sources includes on-site sewage facilities (OSSFs or septic systems) and wastewater treatment facilities (WWTFs).
- Regionalization of wastewater treatment, the conversion of OSSFs to a centralized WWTF, the repair/replacement of OSSFs, and illegal dumping are topics within the realm of this Work Group.

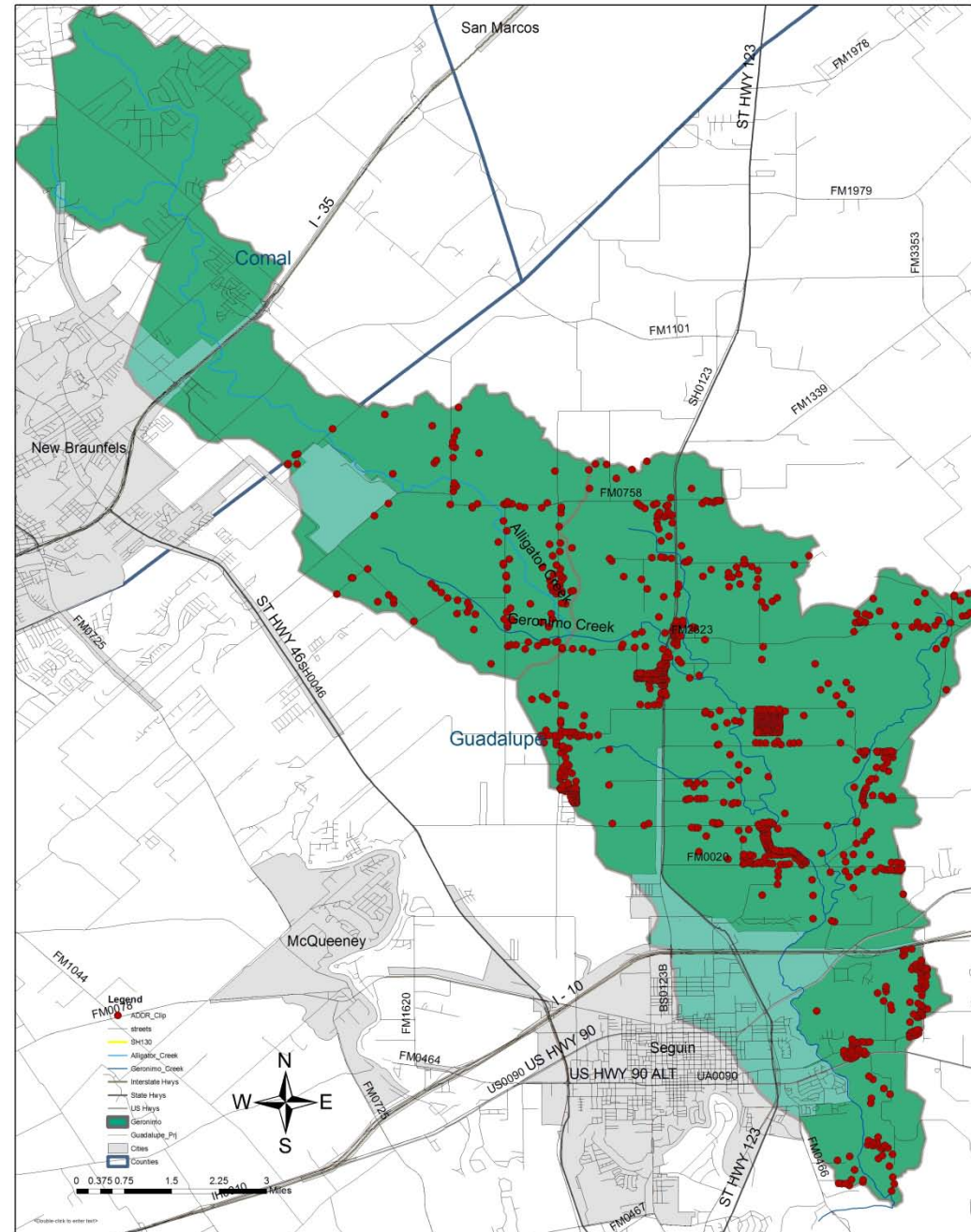
# City Limits

## Geronimo and Alligator Creeks Watershed



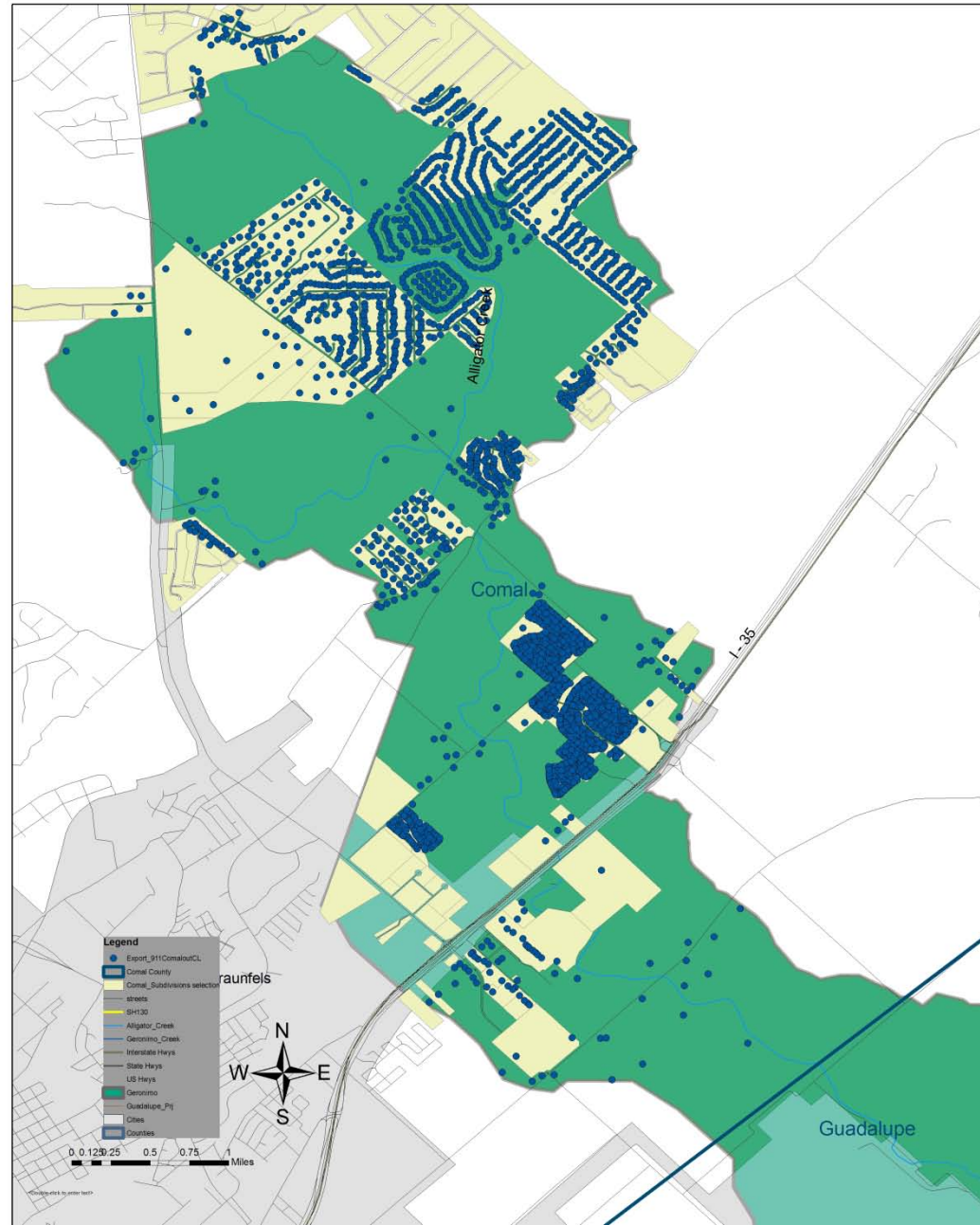
# Guadalupe County Households Potentially on OSSFs

Geronimo and Alligator Creeks Watershed  
Guadalupe County Addresses



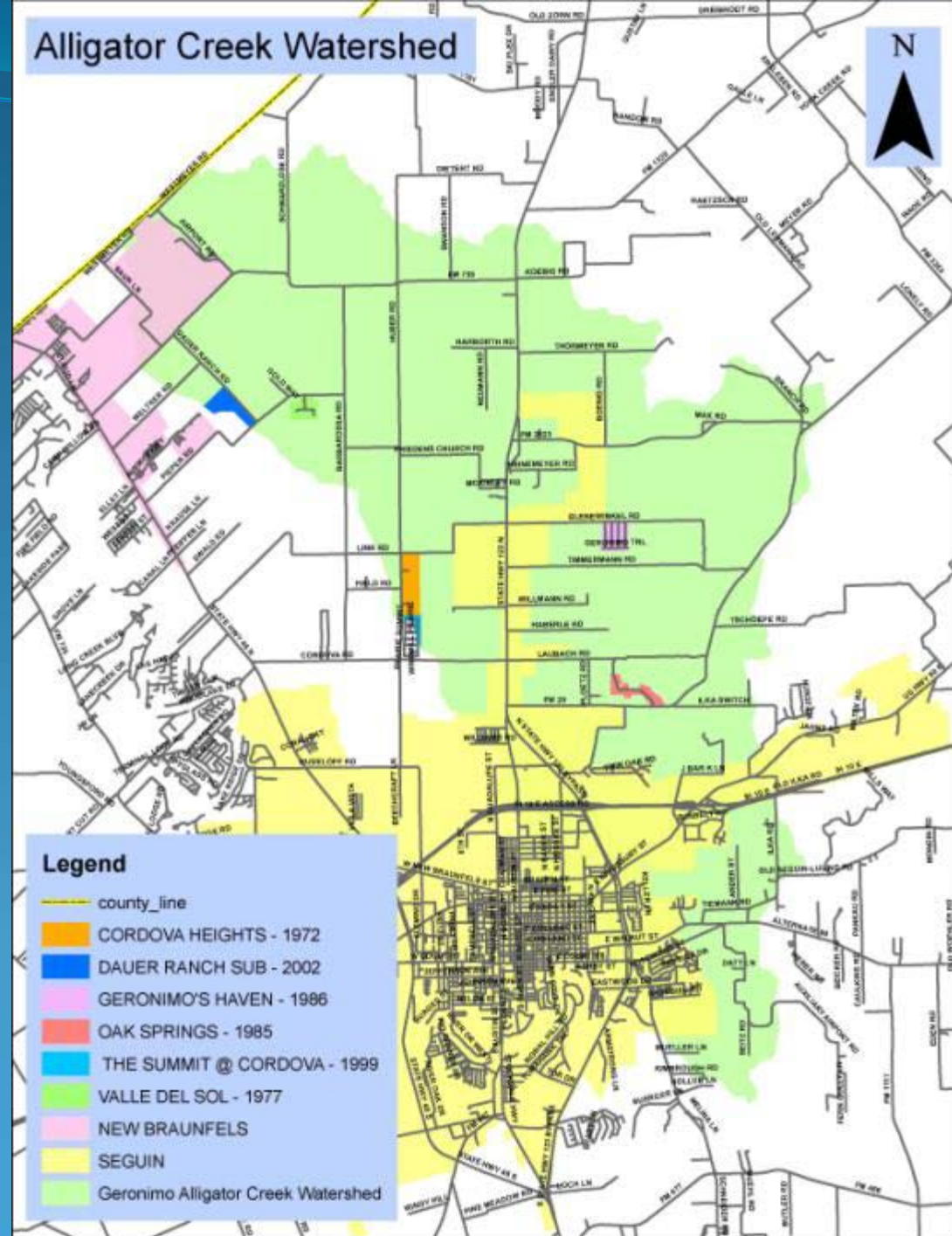


# Comal County Households Potentially on OSSFs



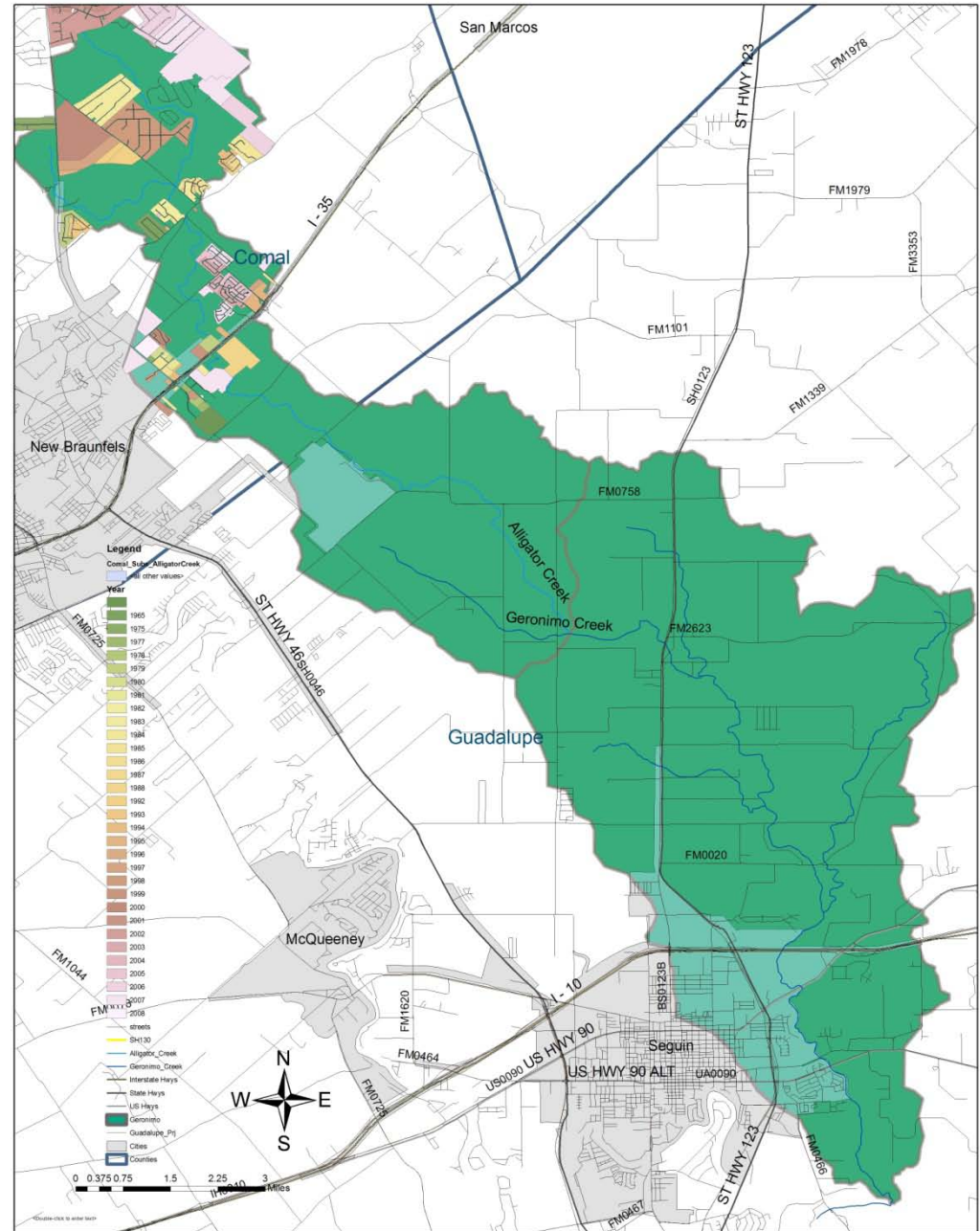
# Subdivisions in Guadalupe County

## Alligator Creek Watershed



# Subdivisions in Comal County

## Geronimo and Alligator Creeks Watershed Comal County Subdivisions





# Inputs Used for SELECT

- Soils data
- Septic system locations
  - 2000 Census
  - GIS subdivision and 911 Address data from Guadalupe and Comal Counties
- WWTF data

# Preliminary Loading Estimate for Septic Systems

**Bacteria Load** = Number of failing systems \* flow \* concentration

Number of failing systems

- Number of homes and people per home from 2000 Census blocks
- Remove areas falling within CCN boundary
- Failure rate average based on soil data (NRCS soil database)
  - Not rated 8%, somewhat limited 10%, very limited 15%

Flow

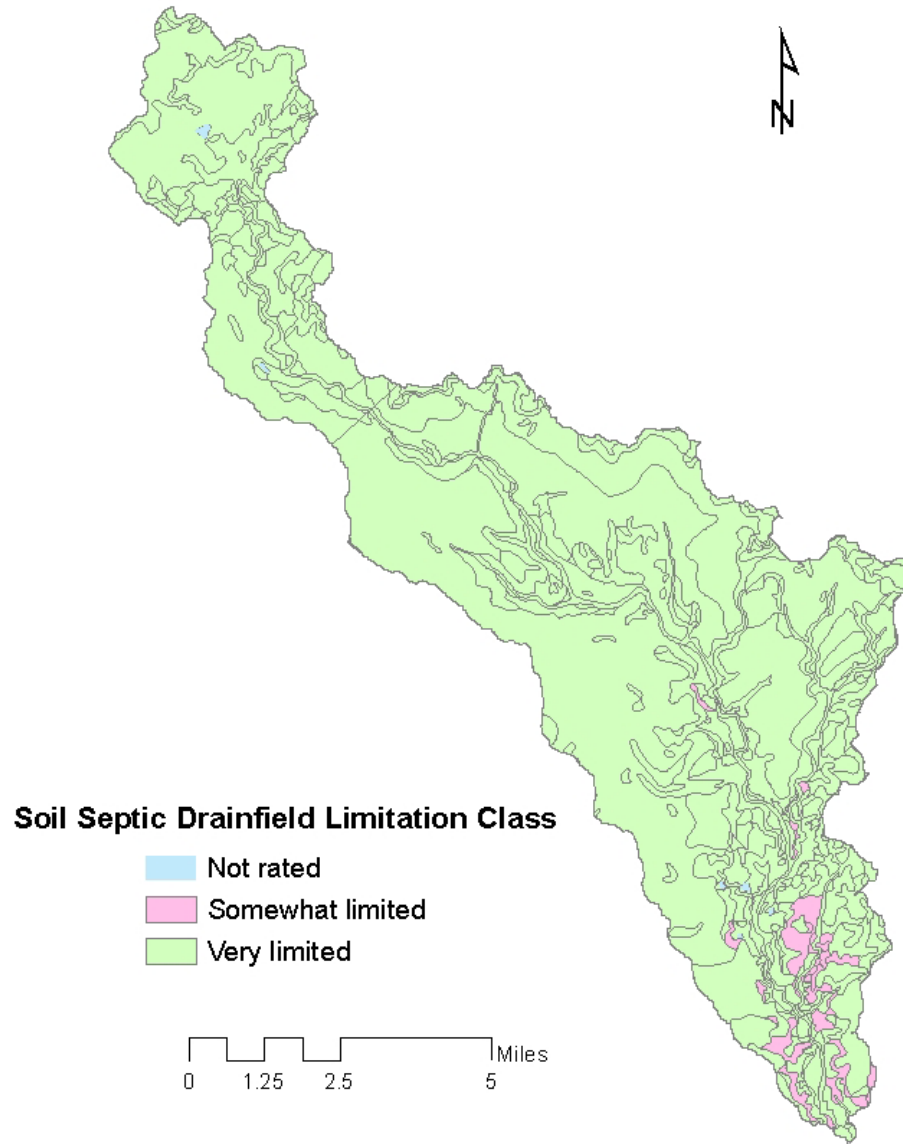
- 60 gal/person/day average

Concentration

- Average concentration of bacteria in effluent ( $\sim 10^6$  cfu/100mL)



# Soil Septic Drainfield Limitation Class



# Next Steps

- Begin Work on Management Measures and Outreach and present recommendations to the Steering Committee
- Modifications to SELECT are currently underway

Questions?