# Bosque River Watershed Initiative
# August 2008

US Army Corps of Engineers
1950 50 YEARS 2000
Fort Worth District

NRCS Natural Resources Conservation Service

Soil Water
TSSWCB
Texas State Soil & Water Conservation Board

Texas Water Resources Institute
make every drop count

Brazos River Authority

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spatial sciences laboratory
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Fort Worth District

# Agenda

Comprehensive Plan – Stacy Gray
Conservation Planning – Steve Bednarz
Modeling– Dr. R. Srinivasan
Tonk Creek Demonstration Project – Dr. R. Srinivasan
Gilmore Creek Demonstration Project – Dr. Larry Hauck
Streamflow & Water Quality Monitoring – Dr. Larry Hauck
Funding Streams & Requirements – Stacy Gray
Q&A and Issue Resolution – facilitated by Stacy Gray

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# Historical Perspective

- 1990: North Bosque identified as nutrient impaired (TCEQ & TSSWCB)
- 1992 – 2000: Texas A&M BREC and TIAER collaborative efforts in Bosque River watershed
- 1992 – Present: BRA, TCEQ, TSSWCB, USEPA & USDA-NRCS fund water quality studies & monitoring
- 2000 – 2006/07: TSSWCB & TCEQ compost assistance
- 2001 TMDL adopted; 2002 I-Plan approved; 2004 TMDL re-evaluation begins
- 2005 – Present: USACE funds for Infrastructure Plan
- 2007: Individual permit applications CAFOs (TCEQ)

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# Comprehensive Plan

- Directed by WRDA ’07, Sec 5139
- Draft completed; will be finalized upon receipt of Implementation Guidance for the project
- Identifies participating agencies and their roles
- Outlines the concept of operations and key components of the operation
- Identifies two demonstration project areas
- Defines schedule and budget for the demonstration projects
- Outlines program and project governance and the communication plan

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# http://bosque-river.tamu.edu/

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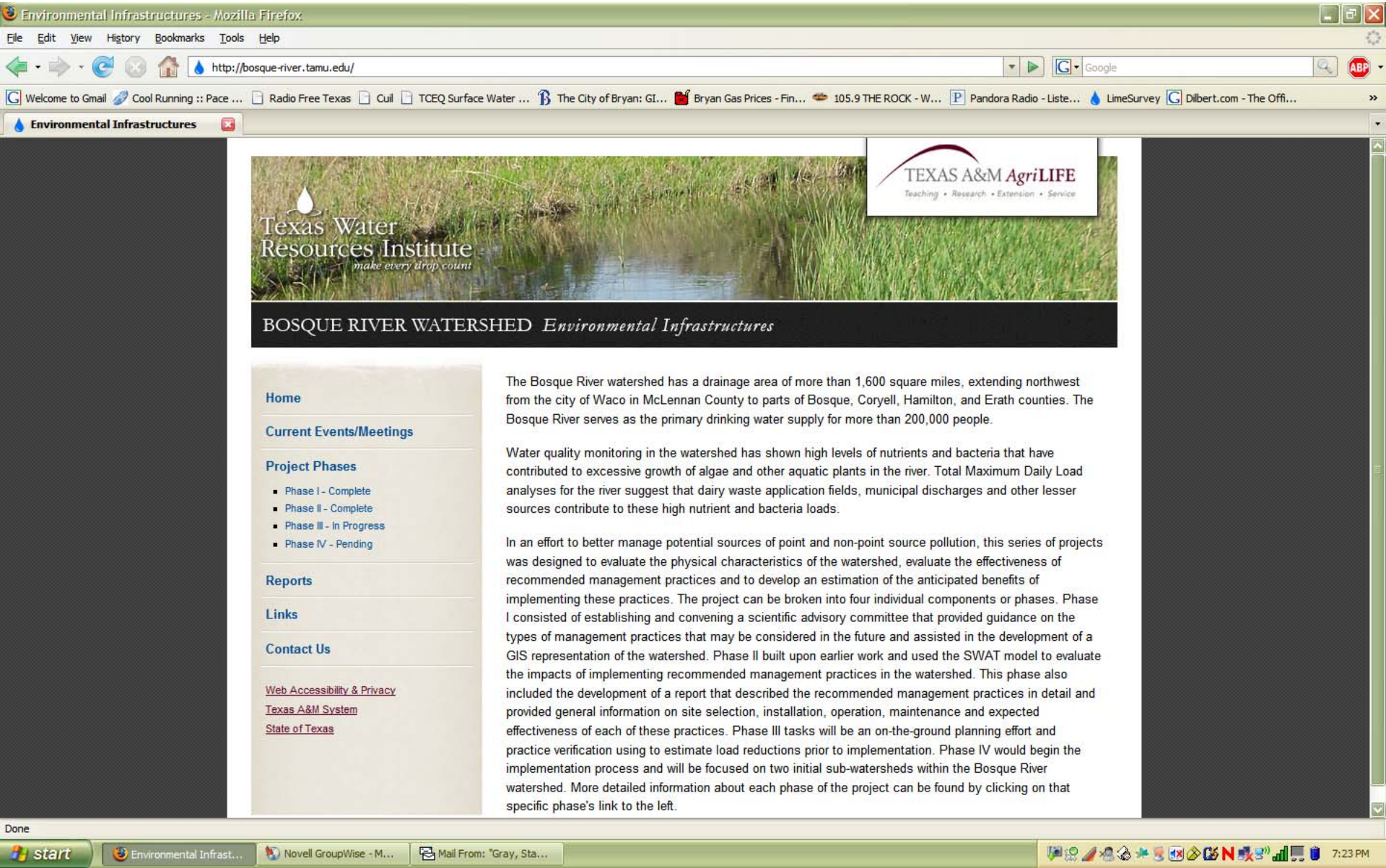

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# *Conservation Planning*

- Watersheds selected for demonstration
  - Gilmore Creek (North Bosque River)
  - Tonk Creek (South Bosque River)
- Selection criteria
  - Historical monitoring
  - Current monitoring
  - Small area; 5-year period for planning and application
  - Land users willing to participate
  - Variation in land use (range, pasture, crop)

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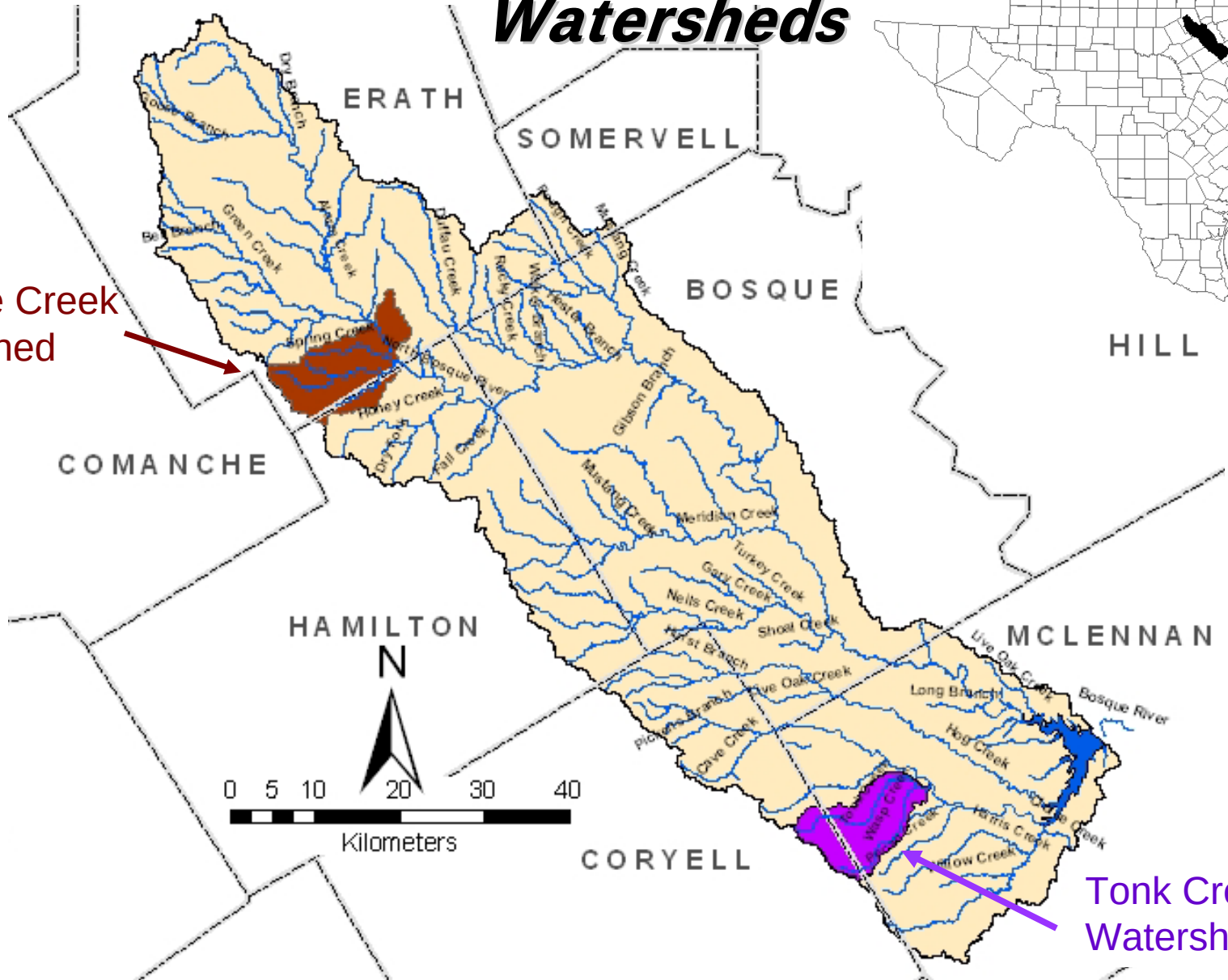
# Gilmore Creek & Tonk Creek Watersheds



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# Conservation Planning

- Resource Management System (RMS) plans
- Conservation practice alternatives
- Conservation practice installation
  - Cost-Share Contracts
- Goal is 75% coverage of each sub-watershed
- Sub-watersheds and data
  - Gilmore Creek – 155 plans on 23,000 acres
  - Tonk Creek – 145 plans on 19,000 acres
- Benefit to cost ratio = 1.64 to 1.0
  - Approximately $14.6 million in benefits

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# Conservation practices

- No-till
- Mulch-till
- Water wells
- Filter strips
- Terrace
- Field Border
- Fence
- Pipelines
- Firebreak
- Nutrient management
- Brush management
- Grade stabilization structure
- Pest management
- Conservation crop rotation
- Upland wildlife habitat management
- Wetland creation or enhancement
- Contour farming
- Critical area planting
- Prescribed grazing
- Prescribed burning
- Range planting
- Pasture planting
- Riparian forest buffe
- Grassed waterways
- Watering facility

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# Modeling

- Model used: ***APEX -*** **A**gricultural **P**olicy/**E**nvironmental e**X**tender
- The model is capable of detailed field scale modeling & routing function connecting farm/field sized subareas.
- Water quality benefits of conservation practices, in terms of % reduction in sediment and nutrient loads at the edge-of-field and the watershed outlet

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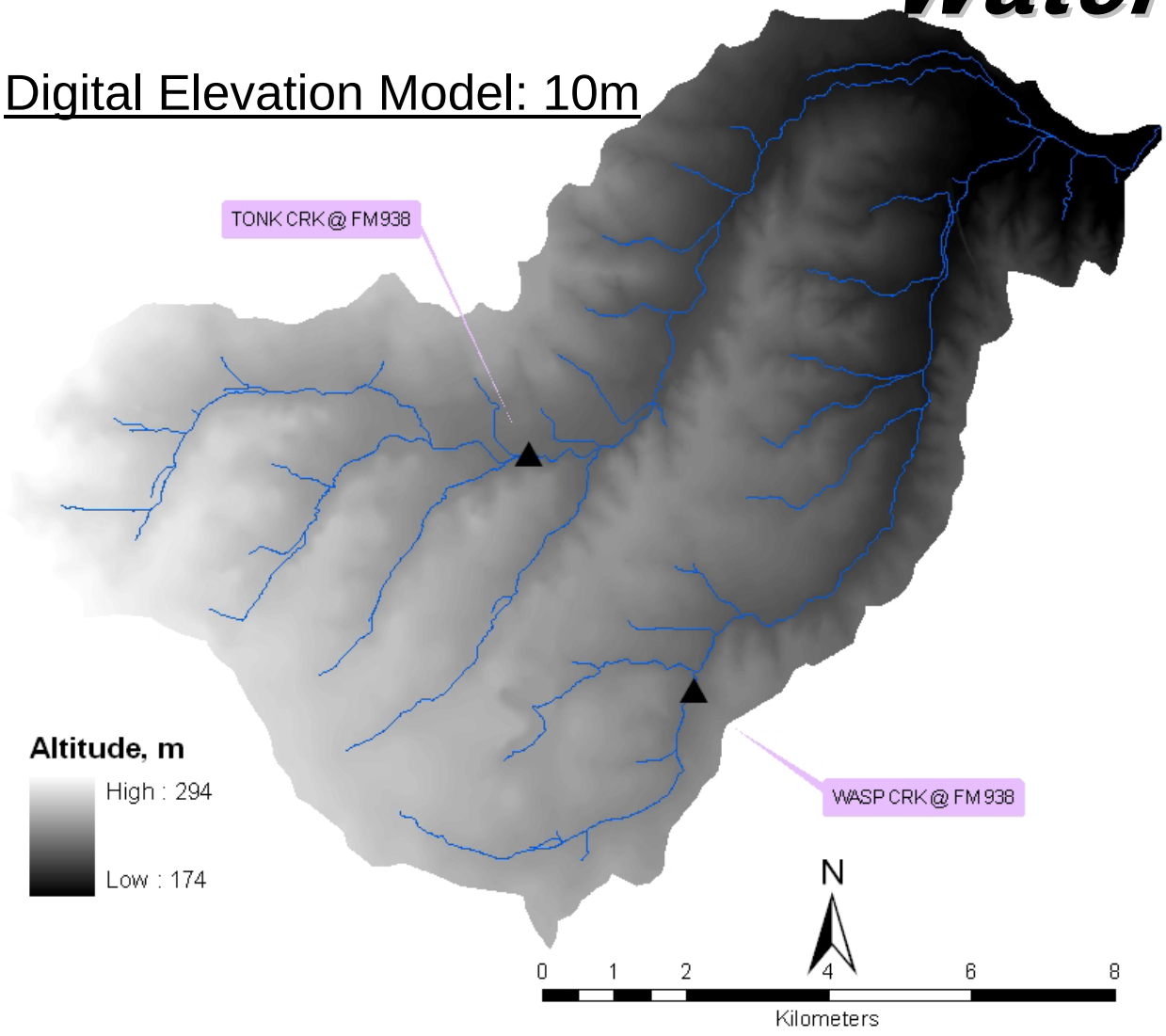
# Tonk Creek Watershed

Digital Elevation Model: 10m





Source: NED from USGS

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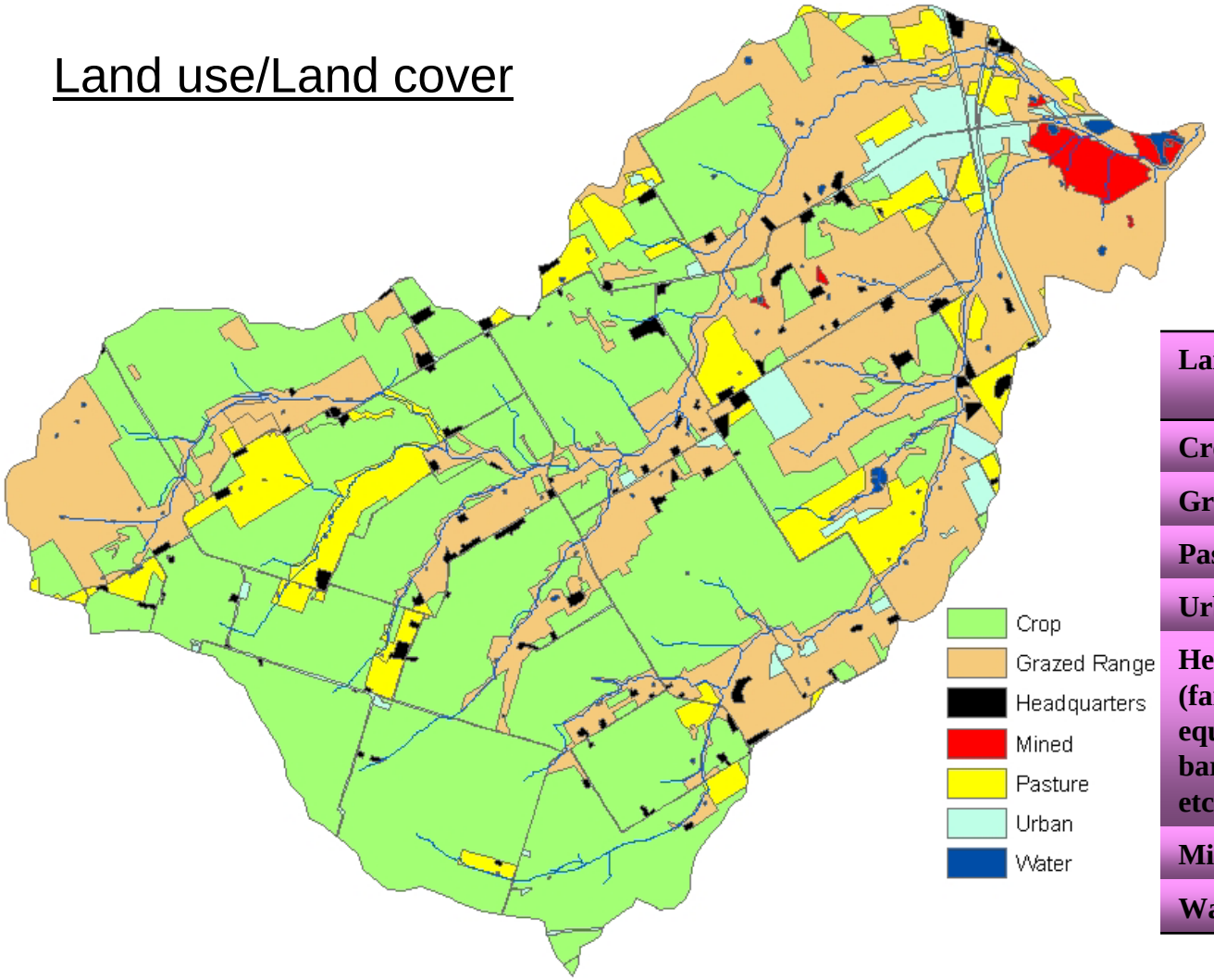
# Tonk Creek Watershed

Land use/Land cover




Source: USDA - NRCS

Watershed area:

104 km$^2$ (25,700 ac.)

Simulation period:

30 yrs (1977 – 2006)

| Land use type | % watershed area (from NRCS GIS shape file) |
|---|---|
| Cropland | 52.5 |
| Grazed range | 31.6 |
| Pasture | 8.3 |
| Urban | 4.3 |
| Headquarters (farm & equip. house, barn yard, etc) | 1.8 |
| Mined | 1.1 |
| Water | 0.4 |

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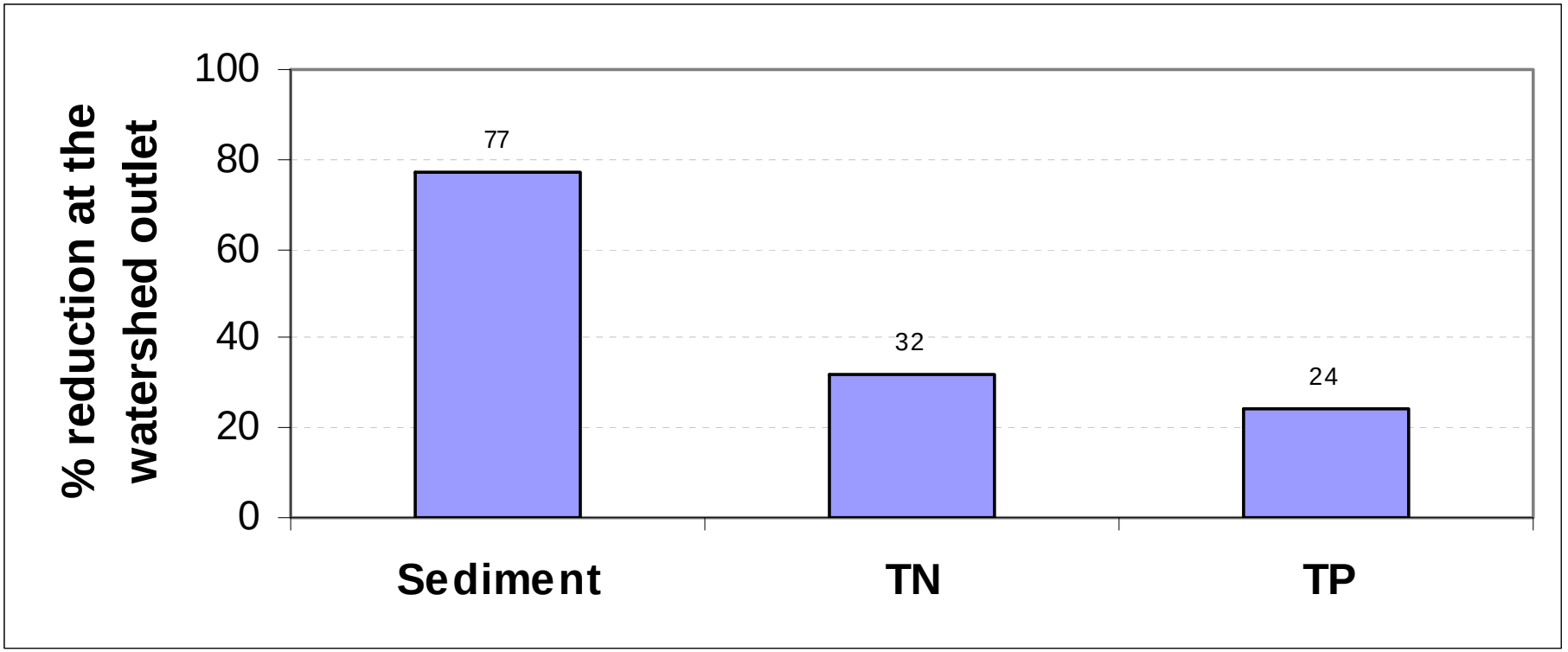
# Water Quality Benefits at Tonk Creek Watershed Outlet




| | Baseline | Scenario 1 |
|---|---|---|
| Cropland | Conventional till | No-till with fertilizer incorporated |
| Rangeland | 15 acres / AU | 30 acres/ AU |
| Pastureland | 3 acres / AU | 5 acres / AU |

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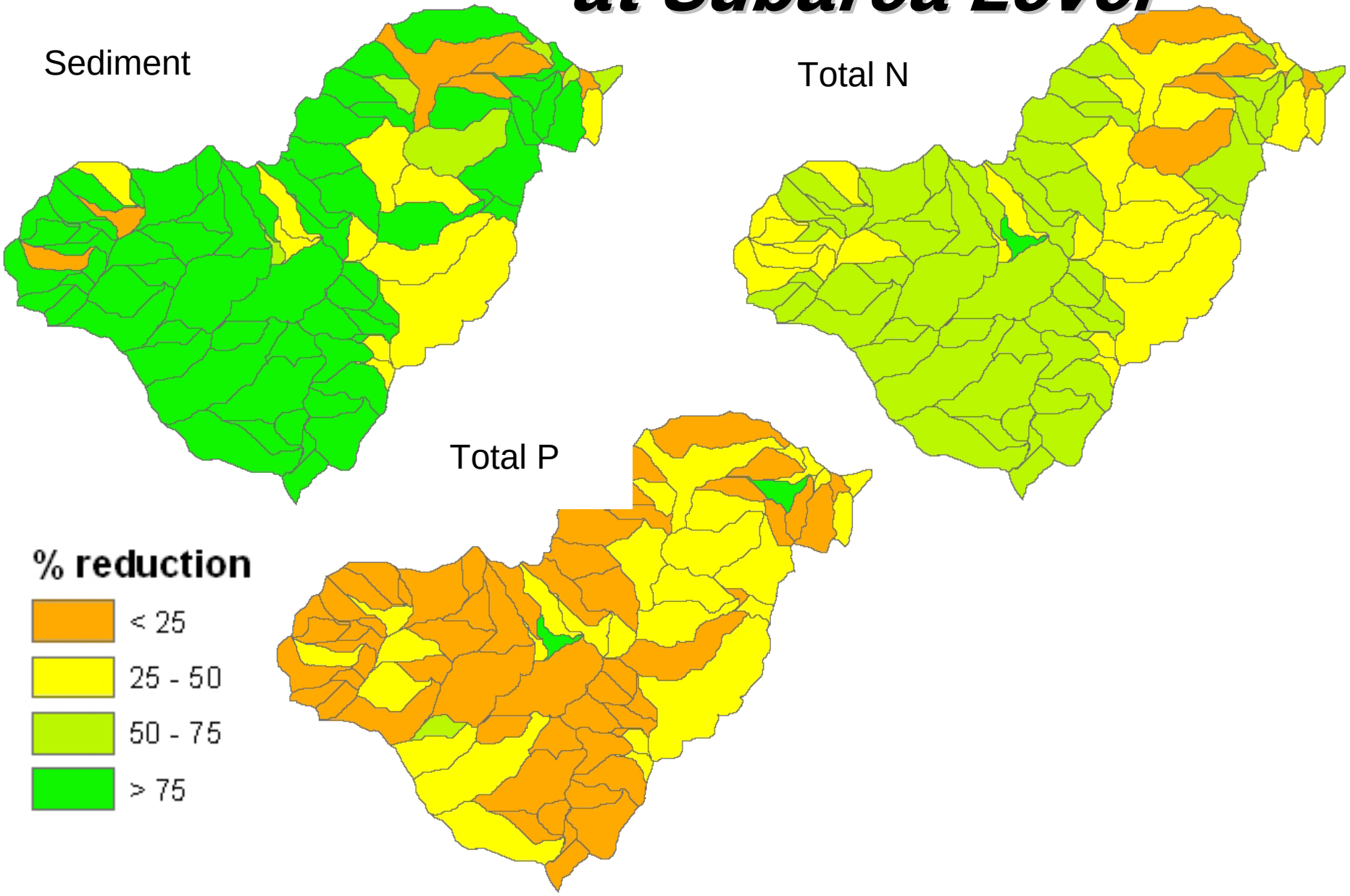
# Water Quality Benefits at Subarea Level



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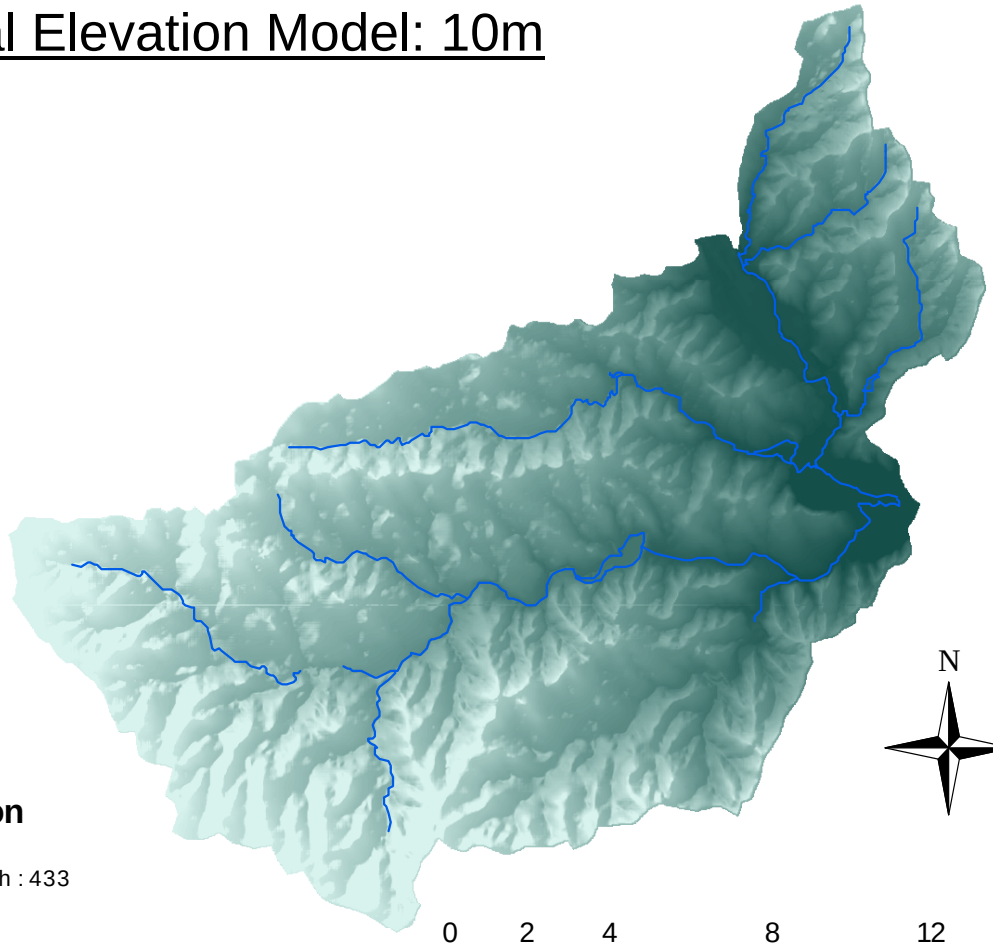
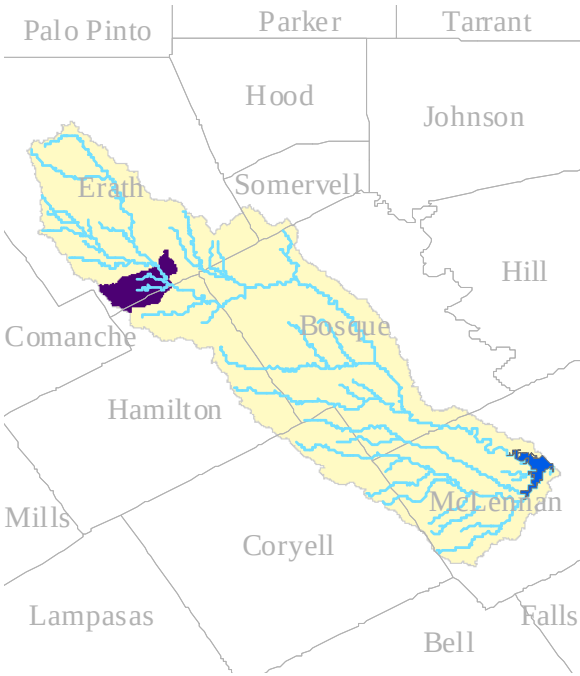
# Gilmore Creek Watershed

## Digital Elevation Model: 10m



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# Gilmore Creek Watershed

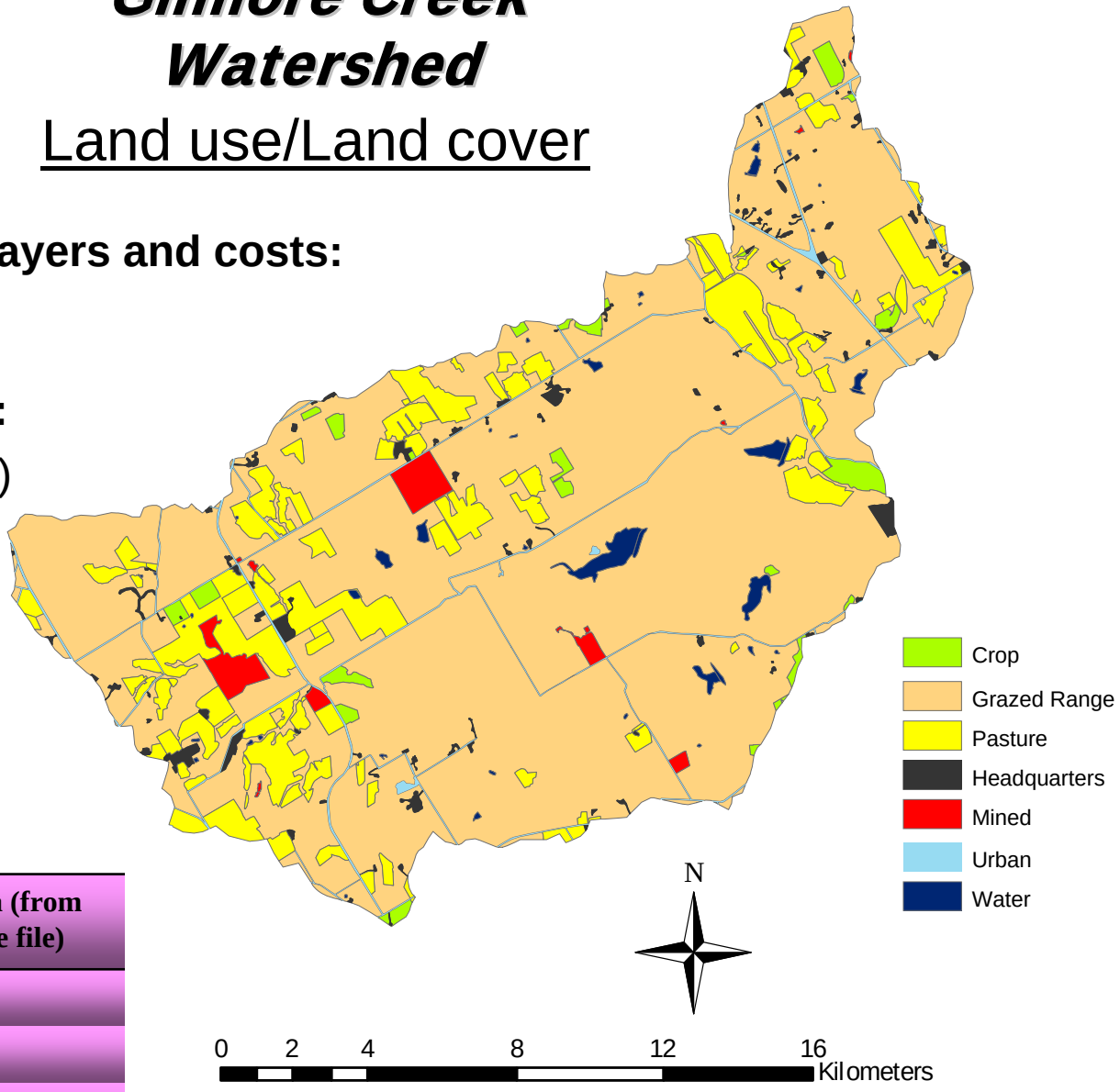
## Land use/Land cover

**Data Source for GIS layers and costs:**

USDA-NRCS

**Total watershed area:**

31,000 acres (125 km$^2$)




| Land use type | % watershed area (from NRCS GIS shape file) |
|---|---|
| Cropland | 1.8 |
| Grazed range | 79.6 |
| Pasture | 13.6 |
| Urban | 1.3 |
| Others | 5.7 |

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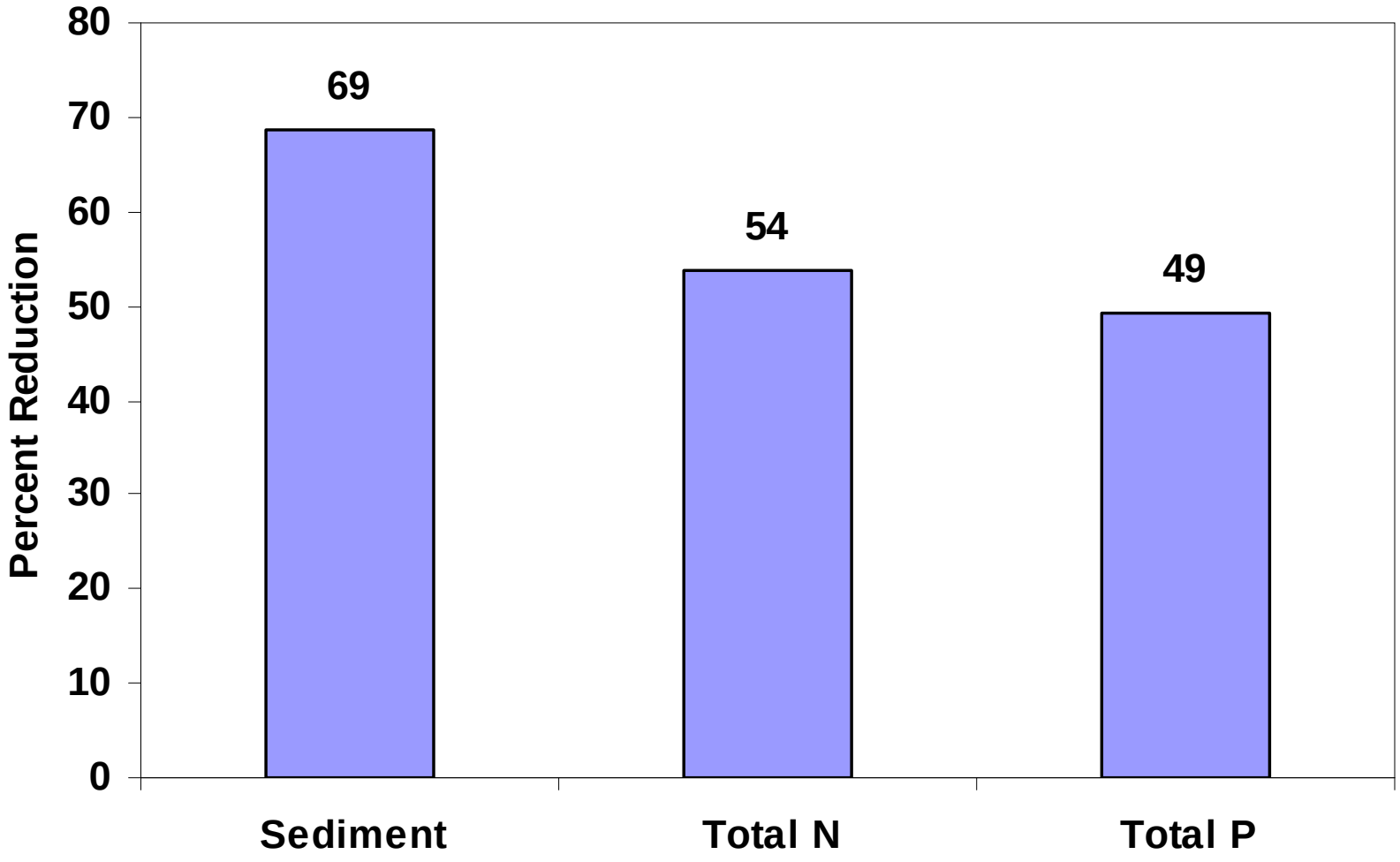
# Water Quality Benefits at Gilmore Creek Watershed Outlet



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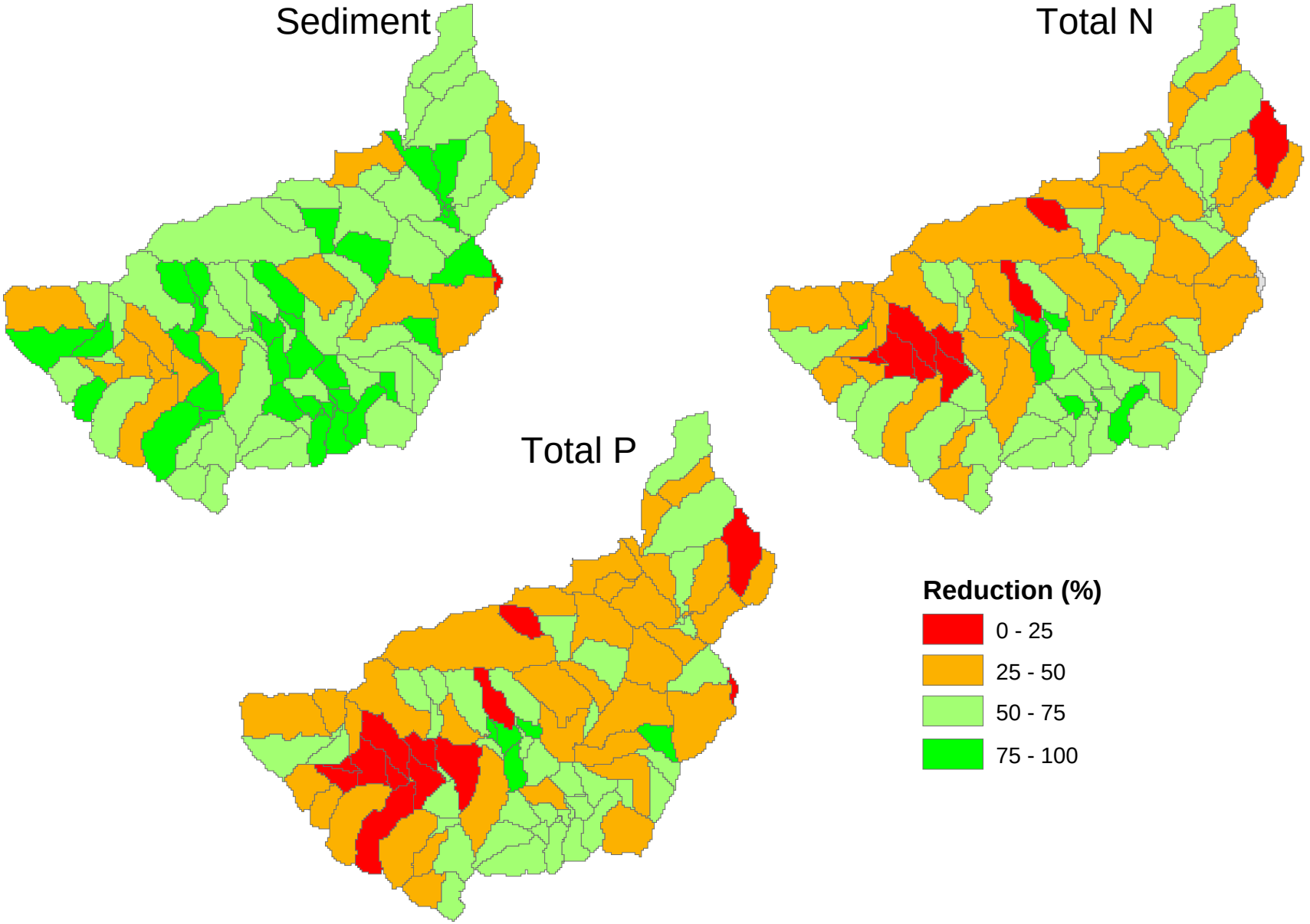
# Water Quality Benefits at Subarea Level

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NF009
NF020
NF050
SF085
SF020
BO020
DB035
BO040
GB020
AL020
IC020
STEPHENVILLE
SC020
LD040
DC040
GC025
DUBLIN
GC045
WB050
BO083
HICO
LG060
GC100
Gilmore Creek: HUC 120602040201
MERIDIAN
GM060
SP020
BO070
HY060
BO090
Cranfills
Gap
CLIFTON
NC060
BO095
BO100
HC060
VALLEY
MILLS
WACO
Crawford
Tonk Creek: HUC 120602030104
TC020
SB065
WC020
MCGREGOR
MB063
Microwatershed station
(TSSWCB funded)
Mainstem North Bosque and major
tributaries station (TCEQ funded)
South Bosque, Middle Bosque and Hog
Creek station (TSSWCB funded)
N
Bosque River Watershed
Current monitoring stations
0
10
20 Kilometers
0
5
10 Miles
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Bosque08AUG2008.pdf

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# Water Quality Sample Analysis

- Total suspended solids
- Nutrients (nitrogen and phosphorus)
- Chlorophyll (measure of suspended algae)
- Bacteria (*E. coli*)
- Dissolved oxygen
- Temperature

- Flow is also recorded

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# Funding Streams

- Memorandums of Agreement in place to move funds
- Universities; invoices based on a negotiated scope of work
- COE-NRCS; Military Interdepartmental Purchase Request (MIPR)
- Texas State Soil and Water Conservation Board; Work In Kind (WIK) credits

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# Funding Requirements

- Currently identified federal funding for execution of Demonstration Projects:
  - 2009 - $1.5 million
  - 2010 - $6.0 million
  - 2011 - $1.5 million
  - 2012 - $1.0 million
- If you send it, we will spend it.
  - Accelerate projects
  - Expand program

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# Questions??

# Issues to be Resolved??

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# Action Items

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