

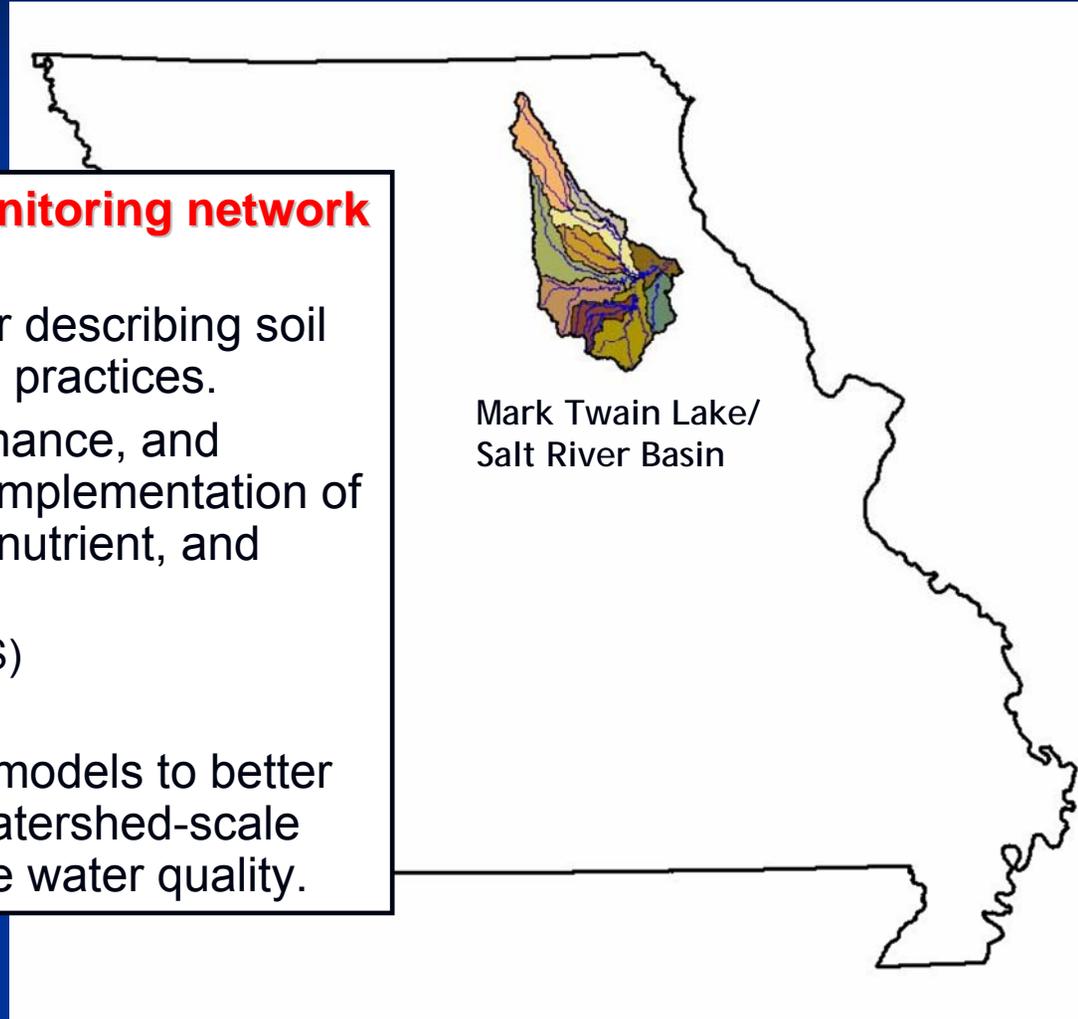
Mark Twain Lake – Salt River CEAP

**Cropping Systems &
Water Quality Research Unit
USDA-ARS
Columbia, MO**

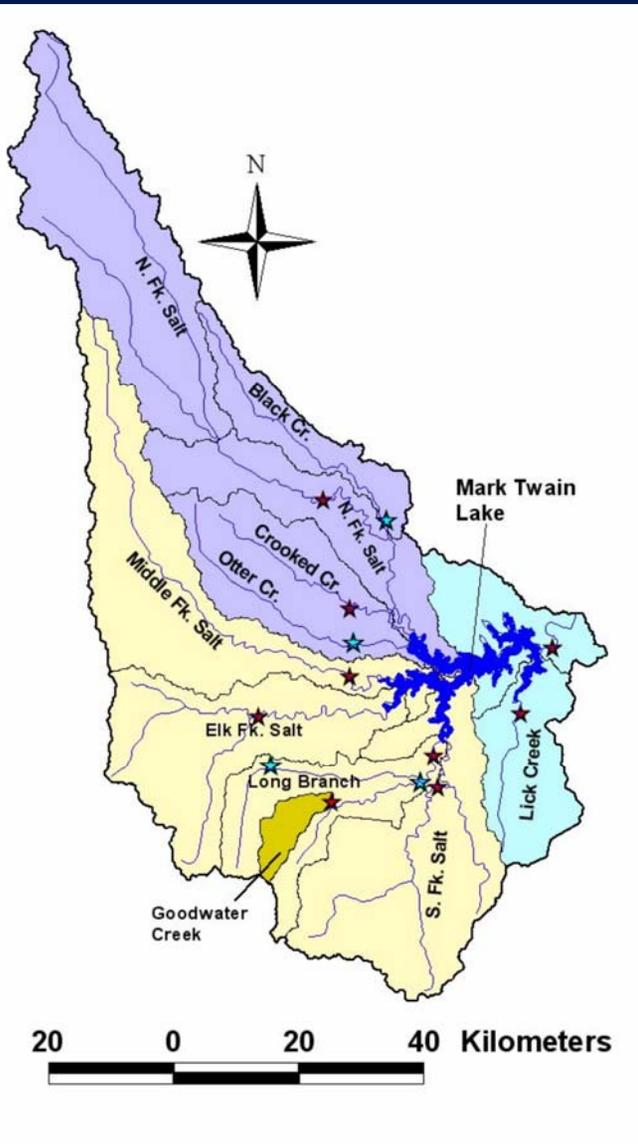
Missouri CEAP

Project Objectives

- **Establish a comprehensive monitoring network within the Salt River basin**
- Assess soil biological activities for describing soil quality under different agricultural practices.
- Develop criteria, evaluate performance, and determine economic impacts for implementation of BMPs associated with herbicide, nutrient, and sediment contamination.
 - Precision agriculture system (PAS)
 - Grass and tree-grass buffers
- Validate and improve watershed models to better assess the impact of field- and watershed-scale management practices on surface water quality.



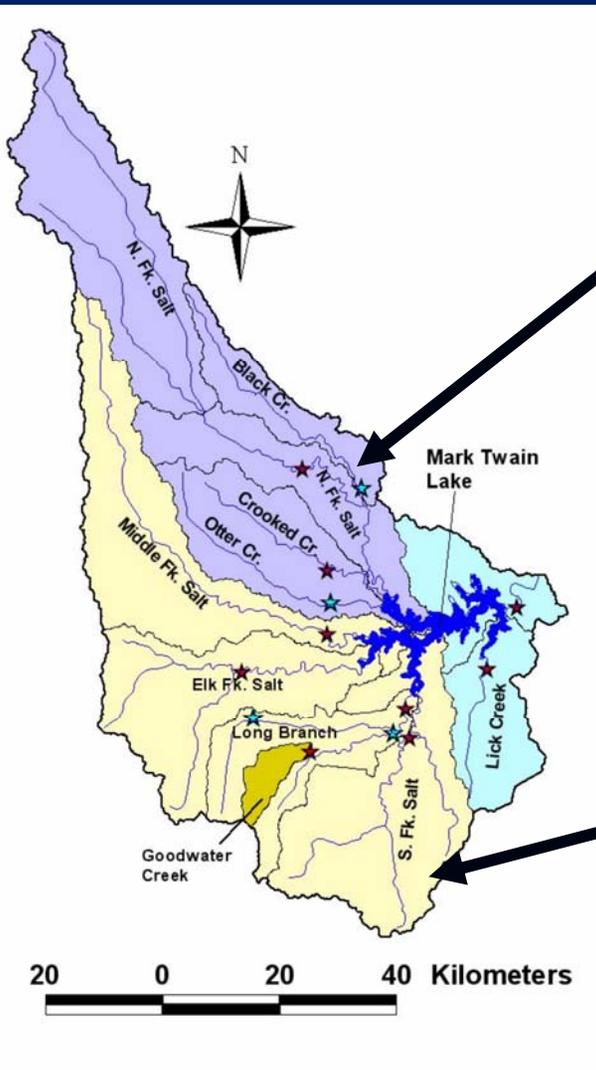
Mark Twain Lake/ Salt River Basin



- Two 8-digit Hydrologic Units
 - North Fork Salt River
 - Middle-South Fork Salt River
 - Nine 11-digit HUA's
- Mark Twain Lake is major public water supply in the region
 - Serves ~42,000 people
 - EPA 303(d) list for Atrazine until 2003
- ~2,300 sq miles in area
- Claypan soils
 - High runoff potential
 - Surface water quality a major concern

Complementary Projects

North Fork Salt River/ South Fork Salt River



North Fork Salt River

WRASP

WRAS

SALT

SIP

South Fork Salt River

SALT

ARS Goodwater Creek WS

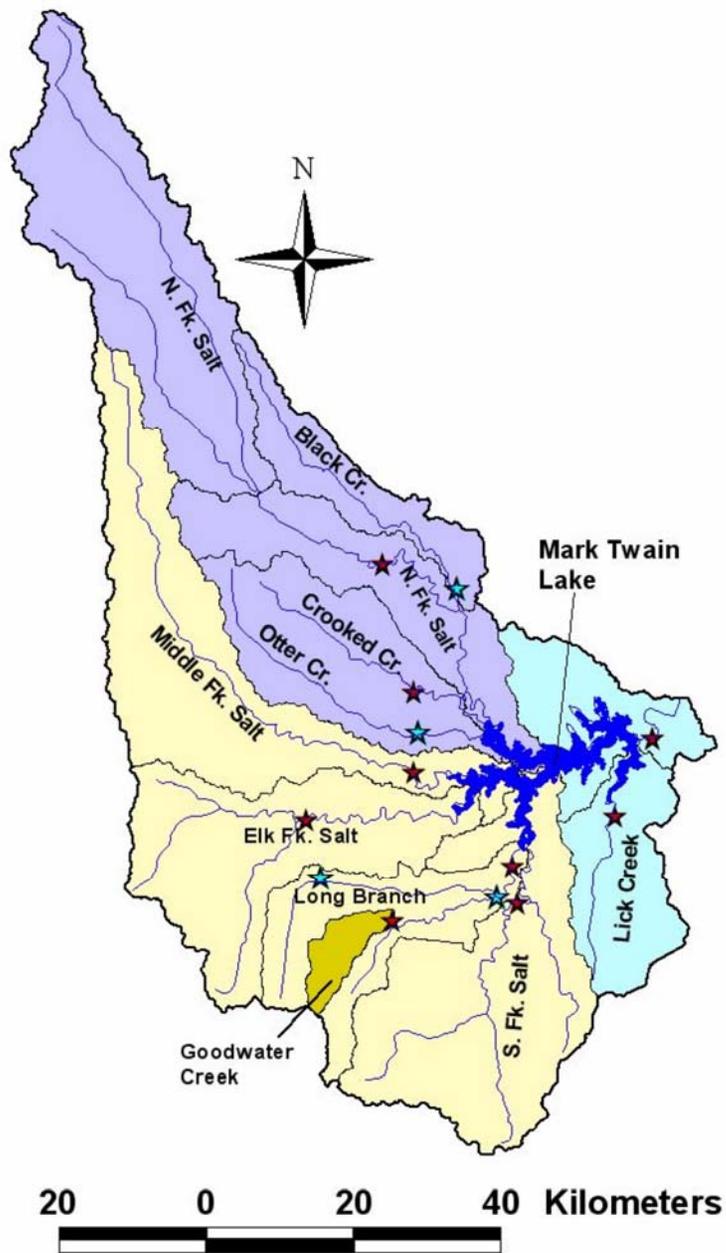
Missouri MSEA

Nested structure planned

Some swine feeding operations

PAS implementation

Basin-Scale Monitoring



■ 13 Monitoring Sites

- Automated samplers for runoff events
- 2-4 grab samples per month
- 10 existing USGS gauged sites
- Rating curves to be developed at 3 sites

■ Mass balance for Mark Twain Lake

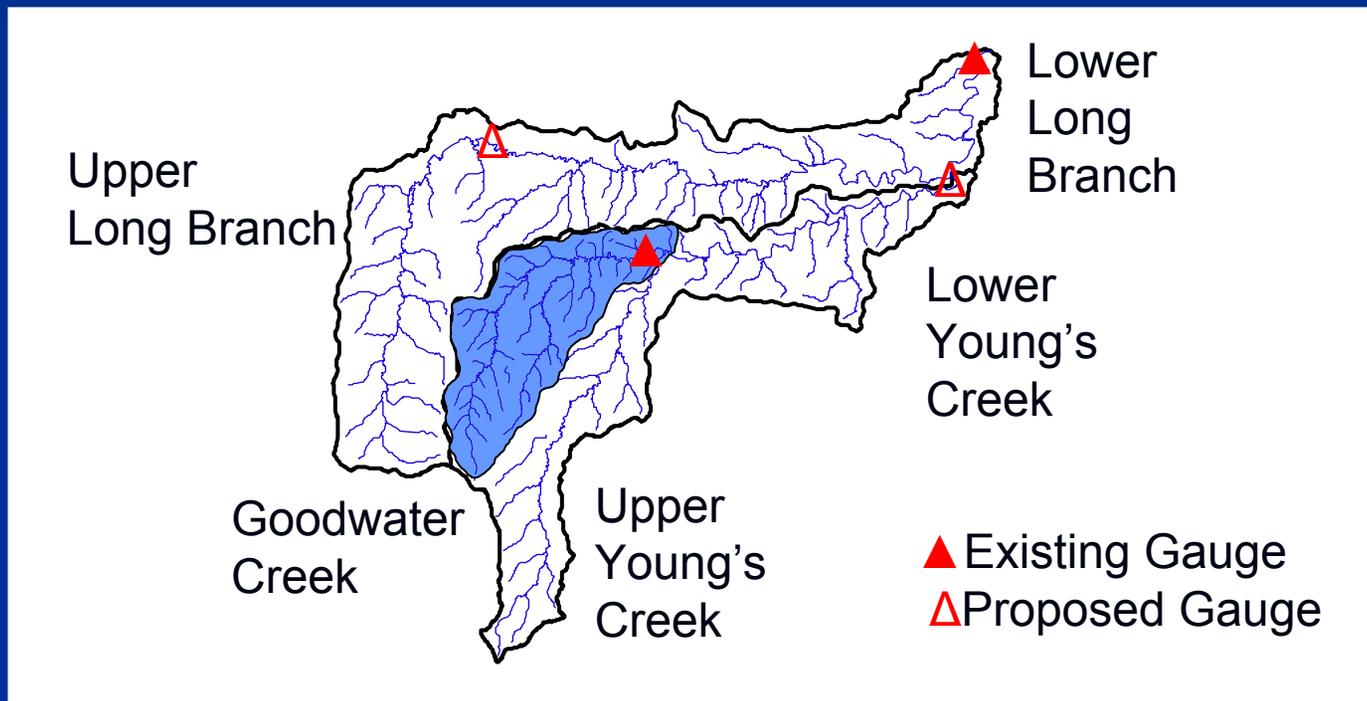
■ Identify 11-digit watersheds contributing highest loads to the lake

■ Identify watershed-specific problems

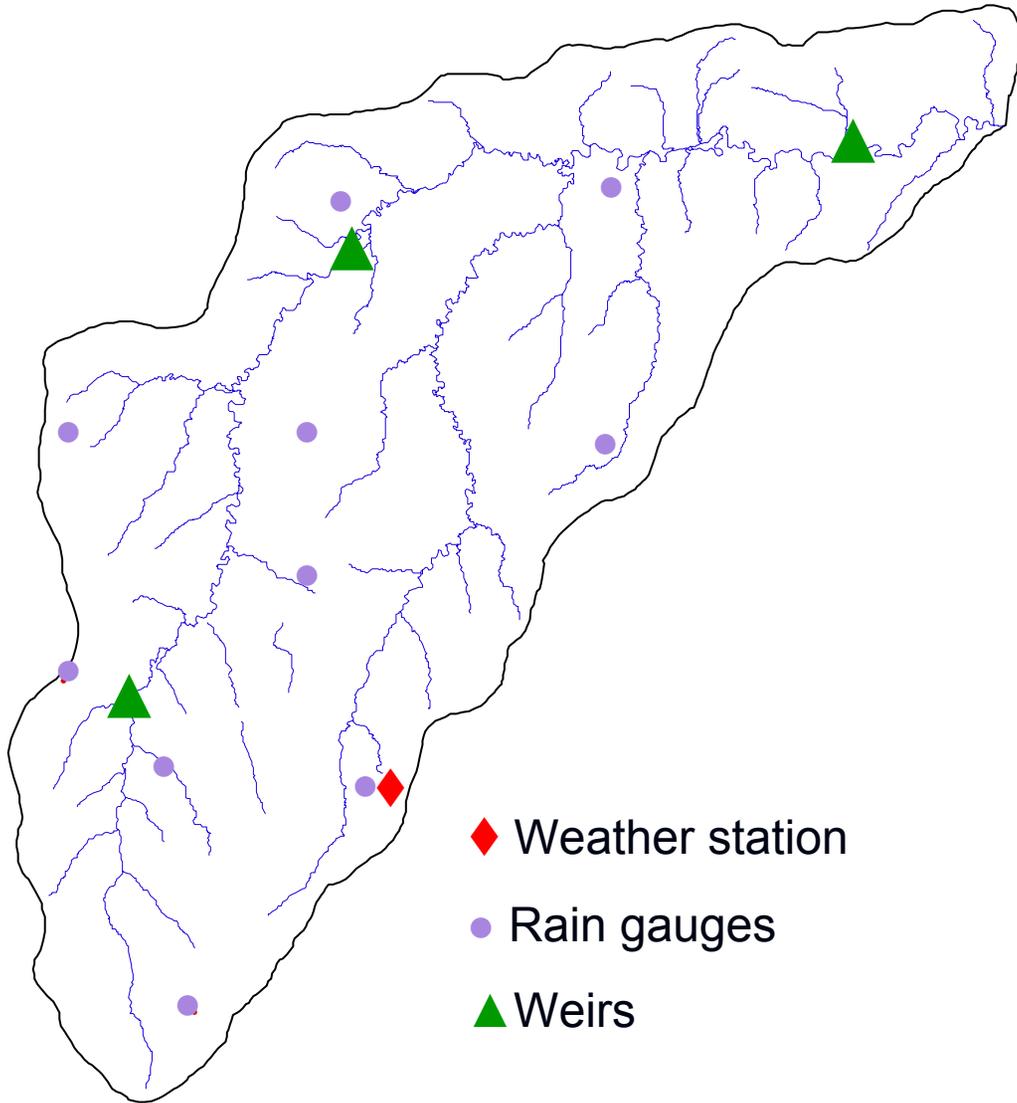
■ Measurements:

- Discharge
- Rainfall
- Herbicides (atrazine, acetochlor, metolachlor, metribuzin, selected atrazine metabolites)
- Nutrients (total and dissolved N and P)
- Suspended sediment
- CSWQRU will perform all herbicide analyses
- MEC will perform nutrient and sediment analyses

Nested Watersheds within Long Branch & Young's Creek HUA

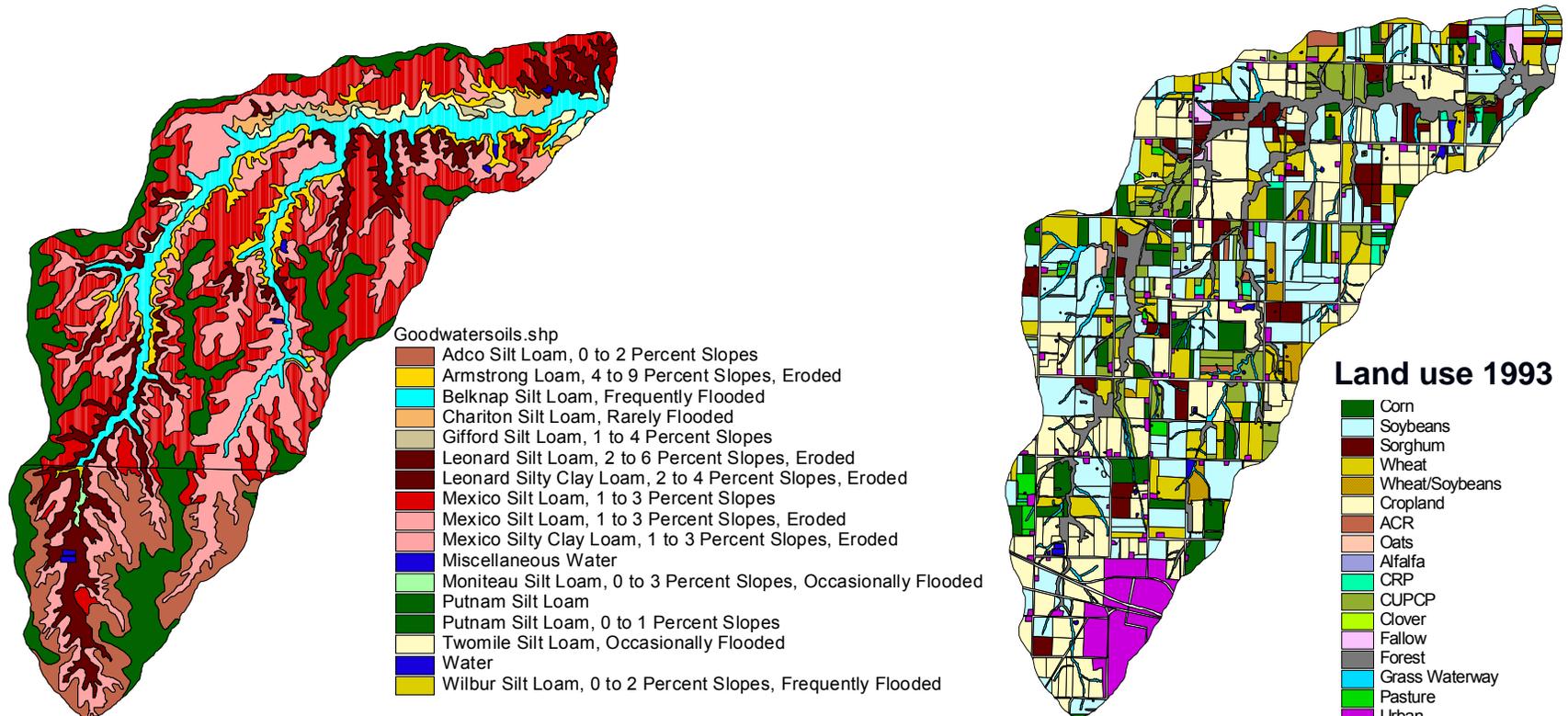


Goodwater Creek Watershed



- Surface water hydrology
 - ~35-yr record
 - Sediment
 - Weather
 - Water table depth
- Water quality
 - ~15-yr record
 - Nutrients
 - Pesticides
 - Surface and ground water

Goodwater Creek Watershed – Soils and Land Use



Interested Parties

- USDA
 - ARS
 - NRCS*
 - FSA*
 - ERS
 - ORACBA
 - NASS*
 - EPA
 - USGS*
 - COE*
 - Missouri Corn Growers*
 - CCWWC*
- U of Missouri-Columbia (UMC)*
 - Water Quality Extension
 - FAPRI
 - SNR
 - MoWIN
 - MoRAP
 - State of Missouri
 - Natural Resources
 - Conservation
 - Agriculture
 - Mo Assoc Cons Dists
 - MFA, Inc.*
 - Water Quality Coordinating Committee
- *Local contacts made

Partners

- Missouri Corn Growers Association
 - Environmental Resource Coalition (ERC)
- MO NRCS
- UMC Water Quality Extension
- Food & Agric. Policy Research Institute (FAPRI)
- UMC School of Natural Resources
- MFA, Inc. Cooperative
- Clarence Cannon Wholesale Water Commission

Project Status

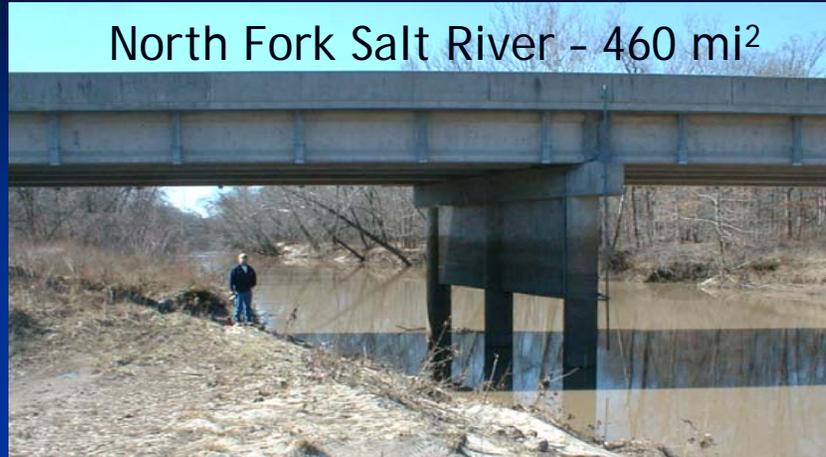
- Negotiated SCA with Missouri Corn Growers Association to conduct basin-scale monitoring
- Implementing basin-scale monitoring project
 - 3 sites fully implemented from previous projects
 - 1 site only requires autosampler installation
 - Other sites to be implemented Spring 2005
- Modelling
 - Calibrated SWAT to Goodwater Creek data
 - Submitting CEAP proposal to CSREES (FAPRI, UMC taking lead)
 - SWAT modeling of Goodwater Creek from 1990-present
 - Extension education component
- 201 CRIS Projects (related to CEAP)
 - PAS implemented (2004)
 - Mitigation of herbicides in runoff by grass buffers completed (2004)
 - Initiated several soil quality studies (2003-2004)
 - Remote sensing and water quality in Mark Twain Lake (2004)

Salt River Basin

Salt River - downstream of Mark Twain Lake (~2300 mi²)



North Fork Salt River - 460 mi²



Long Branch Creek - 182 mi²



Crooked Creek - 82 mi²