Beasley Lake Watershed

National Sedimentation Laboratory

Water Quality & Ecology Research Unit

USDA ARS

Oxford, Mississippi

M. A. Locke, S. S. Knight, C. M. Cooper, S. Smith, Jr., M. T. Moore, F. D. Shields, Jr., and R. F. Cullum

Beasley CEAP Objectives

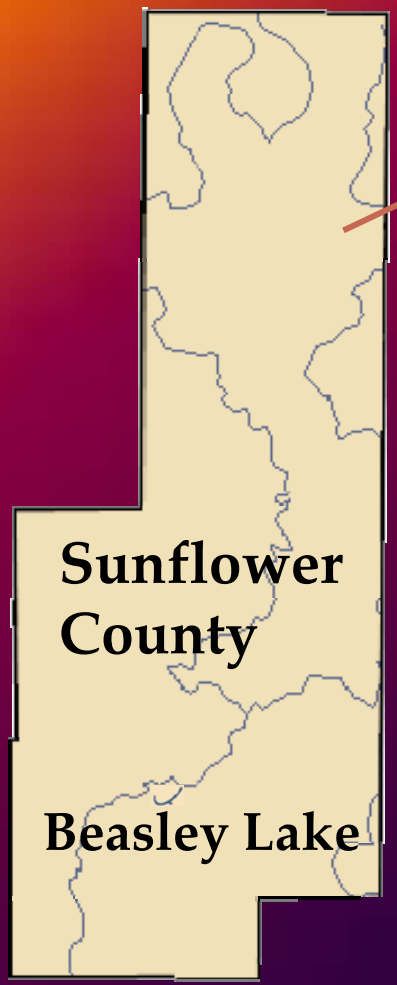
- Evaluate conservation practices by documenting water quality and ecological effects at appropriate scales.

- Provide database of water quality, ecological, land management, and economic data for assessing BMPs that can be used in models like AnnAGNPS.

Beasley Lake Watershed Background

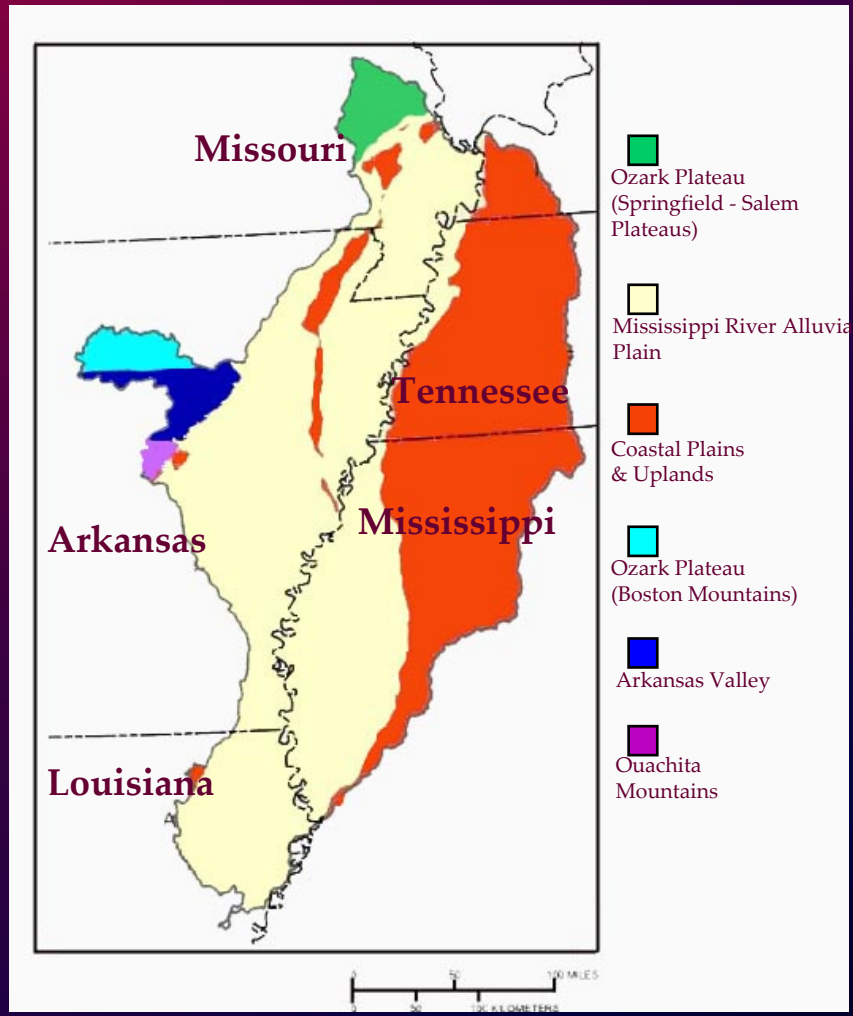
- Originally a part of the Mississippi Delta MSEA project.
- Tested the effectiveness of structural measures typically found at the edge of fields.
- These practices included: slotted pipes, slotted board risers, grassed buffer strips, stiff grass hedges, constructed wetlands, and grassed waterways.
- Edge of field methods proved less effective than agronomic or agronomic and edge of field methods combined.

Study Site: Beasley Lake Watershed



- Location: Sunflower County, MS
- Dimensions: 25-ha lake, 850-ha watershed, 125-ha forested riparian zone

Represents a sub-region of the Lower Mississippi River Basin, an alluvial plain known as the "Mississippi Delta"



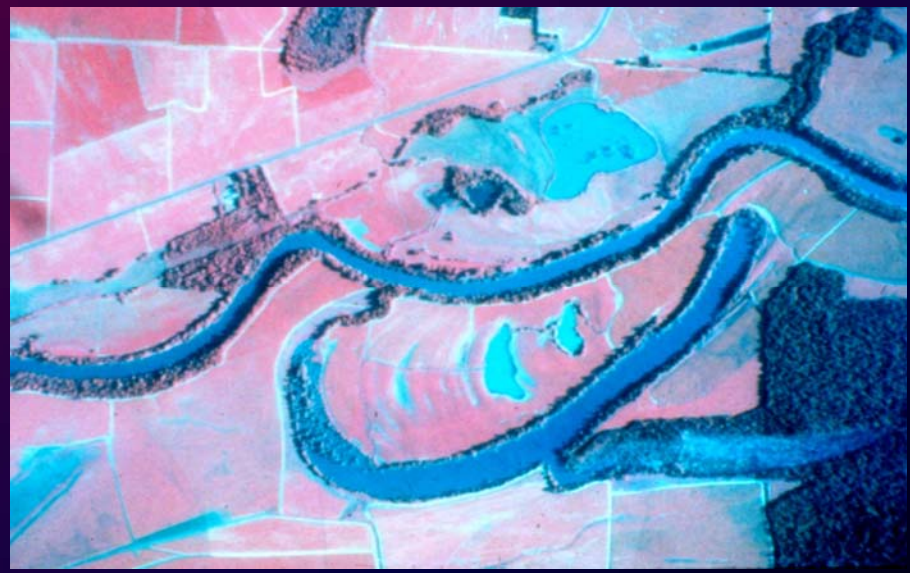
Regional Distinctions

- **Humid subtropical climate:**
  - Rainfall (131 cm)
  - Temperature (18 C)
- **Flat topography:**

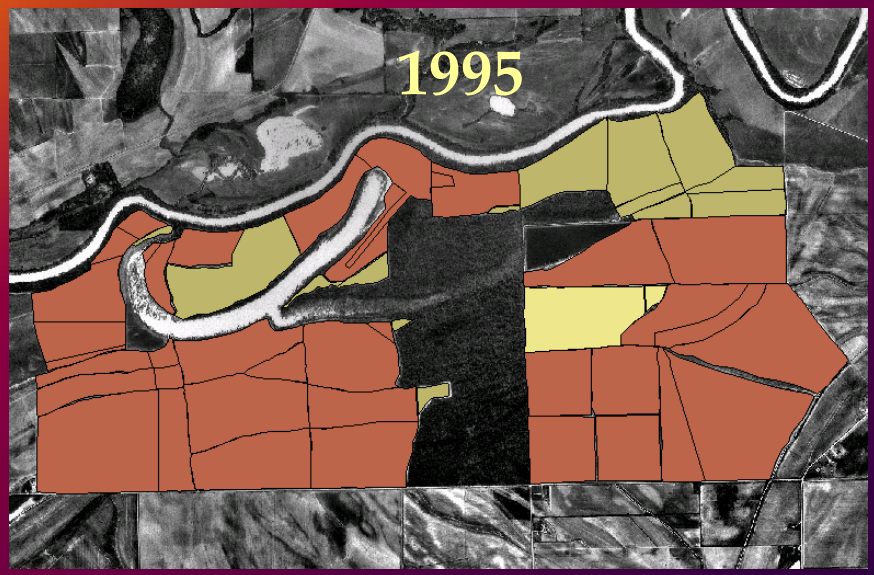
  Surface runoff
- **Cropping systems:**
  - Cotton
  - Soybean
  - Rice
  - Catfish

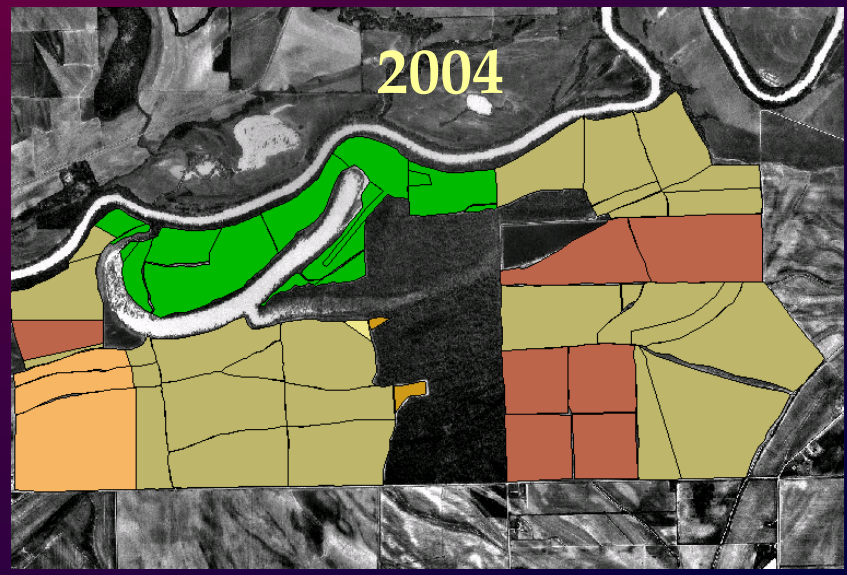
Watershed Characteristics

- Relatively small watershed
- Closed system
- Common feature in Delta landscape
- Associated riparian systems



Land Use in Beasley Watershed





CRP
Corn
Cotton
Sorghum
Soybean

91 ha were planted in oaks and cottonwood (612)

BMPs to be Evaluated

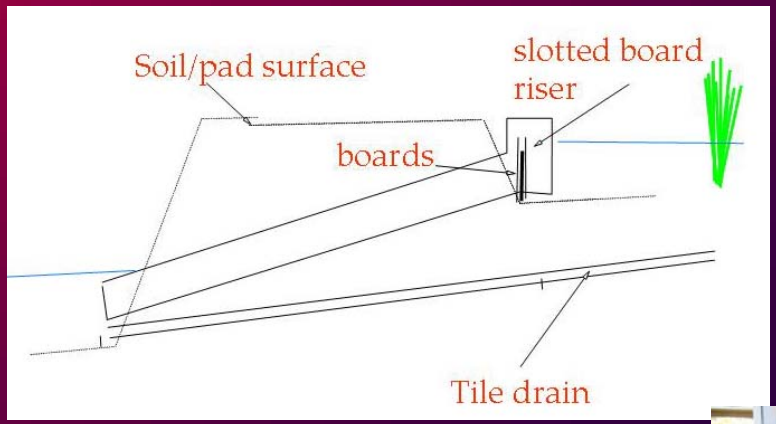
Throughout the year, evaluate water quality (sediment, nutrients, pesticides) from runoff of various BMP treatments and from lake water samples taken at three locations. BMP treatments include the following:

1. Conservation Reserve Program
2. Stiff Grass Hedges
3. Slotted pipe inlets
4. Vegetated Agricultural Drainage Ditches
5. Constructed wetlands and riparian zones

Runoff Monitoring Activities

Edge of Field Structural Practices

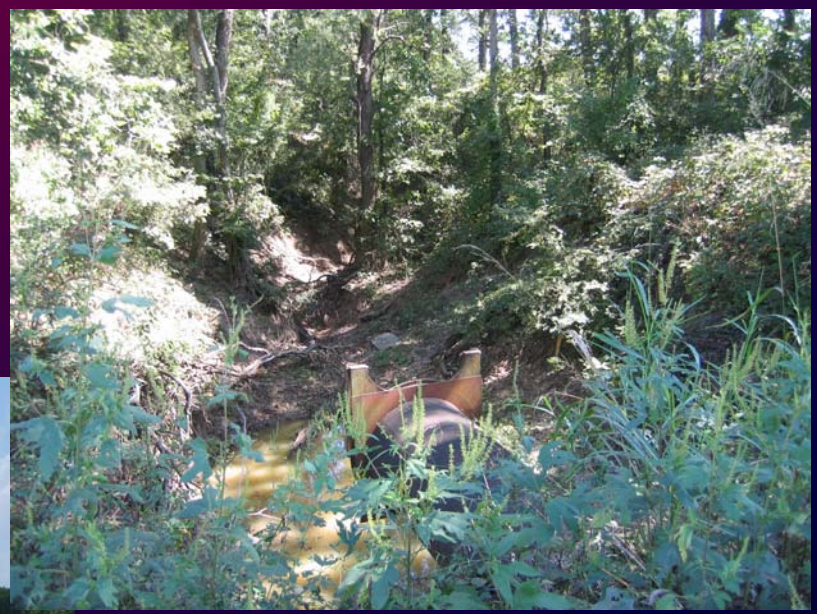
- Grade control pipes with slotted board risers (410)
- Pipes with stiff grass hedges (601)
- Pipes with grass hedges and tile drains (606)
- Six locations in the Beasley Lake watershed



Conservation tillage with winter cover, and conservation tillage with winter cover and a slotted-board riser, reduced suspended-sediment concentrations in runoff by 48 and 62%, respectively.

Evaluation of CRP on Water Quality

We plan to collect flow weighted runoff samples from three sub-watersheds in CRP and compare that to samples from three in conventional tillage sites.



Lake Water Quality and Ecological Integrity

- Assess dynamics of sediment / pesticide / nutrient occurrence in lake water and determine BMP role in improving water quality
- Evaluate the health and ecology of plankton and fish communities in Delta oxbow lakes

Lake Ecology Activities

- Lake water sampled bi-monthly from three sites and lake outlet
- Physical and chemical parameters
- Coliform Bacteria, Plankton and chlorophyll A
- Fisheries

Beasley Lake Watershed – CEAP Progress to Date

- Established array of temperature sensors in lake.
- Installed turbidity probe at outlet and center of lake site.
- Selected runoff site locations in CRP sub watersheds.
- Selected control sites for CRP study.
- Collecting runoff from 6 edge-of-field sites.
- Collecting data from on site weather station.
- Compiling and formatting data from Mississippi Delta MSEA Project for database modeling effort.