

- Identification of areas within the Cabin-Teele for special applications such as stream diversions and wetland restoration /construction
- Complete AnnAGNPS model drainage network for Cabin-Teele.

Future Work

Future needs in the Cabin-Teele include:

- Location identification, installation, and instrumentation of BMPs and special applications within the Cabin-Teele
- Stream flow sampling and analysis
- Modeling/Simulation of the Cabin-Teele using the model AnnAGNPS.

Expected Results

The expected results of this study are:

- Quantitatively document water quality improvement regarding nutrient and sediment loads within a watershed using a suite of different management practices strategically located within the watershed
- To be able to determine the contribution in-stream processes have on nutrient reduction in surface waters in Northeastern Louisiana
- To determine the effectiveness and efficiency of stream diversion through wetland areas in reducing nutrient loads for water returning to the stream
- Determine the effectiveness of different combinations of management practices through modeling and simulation
- Determine the cost effectiveness of different combinations of management practices through economic analysis

Extension, Outreach, and Educational Activities

The extension and outreach efforts will be directed through workshops and briefings. The workshops will:

- Present an overview of the project to stakeholders

- Engage stakeholders in research process at onset of study
- Gather preliminary information from stakeholders on BMPs to be analyzed
- Present findings of initial analysis
- Obtain suggestions on refinements
- Evaluate stakeholder response to findings and recommendations of the study for implementing BMPs

The Briefings will:

- Be informational briefings based on findings of the study

Agencies and Organizations with Interest or are Involved in the Cabin-Teele Sub-Watershed

ARS: USDA, Agricultural Research Service.
Ducks Unlimited
Fifth Louisiana Levee District.
LDAF: Louisiana Department of Agriculture and Forestry.
LDEQ: Louisiana Department of Environmental Quality.
LDWF: Louisiana Department of Wildlife and Fisheries.
Louisiana Cotton Producers Association.
Louisiana Governors Office of Coastal Activities.
Louisiana Hypoxia Working Group.
Louisiana State University Agricultural Center.
Louisiana State University Coastal Ecology Institute.
Louisiana State University Cooperative Extension Service
Louisiana State University School of the Coast and Environment
MRBA: Mississippi River Basin Alliance
MSWCD: Madison Parish Soil and Water Conservation District
Nature Conservancy
NRCS: USDA, Natural Resources and Conservation Service
RS&D: Northeast Delta Resource Conservation & Development
USACE: United States Army Corps of Engineers
US-EPA: United States Environmental Protection Agency
USGS: United States Geological Survey

Contact:

 **Soil and Water Research Unit**
4115 Gourrier Ave, LSU Campus
Baton Rouge, LA 70808-4443
J.L. Fouss, Research Leader (225) 578-0743

An Integrated Evaluation of the Economic Effectiveness of Implementing, BMPs on Water Quality in the Cabin-Teele Sub-Watershed, Louisiana.
By Timothy W. Appelboom

Problem Statement

The growth of the Mississippi River basin into one of the worlds most important agricultural regions has caused serious water quality problems throughout the basin, both at the local level (degraded surface waters) and regional level (hypoxia zone generation in the Gulf of Mexico) via wetland loss, drainage expansion, and increased fertilizer use.



Mississippi River Basin (Source: EPA)

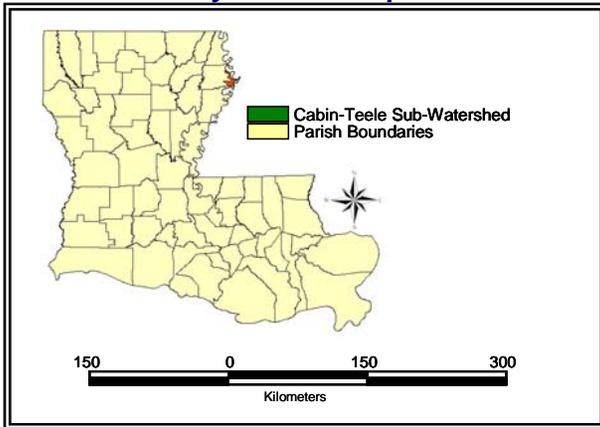
Objectives

The objectives of this research are to:

- Measure nutrient and sediment retention of several Best Management Practices (BMPs) (buffer strips, tillage management, and cover crops), controlled drainage, and drainage diversion through wetlands
- Determine contribution of in-stream processes for nutrient removal from surface waters

- Use field data to calibrate the continuous simulation, watershed scale, pollutant loading model AnnAGNPS (Annualized Agricultural Non-Point Pollution Model)
- Use the AnnAGNPS model to evaluate different BMP mixes and placement within the Cabin-Teele sub-watershed to maximize water quality improvement and decrease potential flooding within the sub-watershed
- Conduct an economic analysis to estimate the cost effectiveness of the different management strategies in retaining nutrients and sediment within the Cabin-Teele sub-watershed.

Study Site Description



Location of Cabin-Teele Sub-Watershed (Source: USDA-NRCS)

The Cabin-Teele Sub-Watershed:

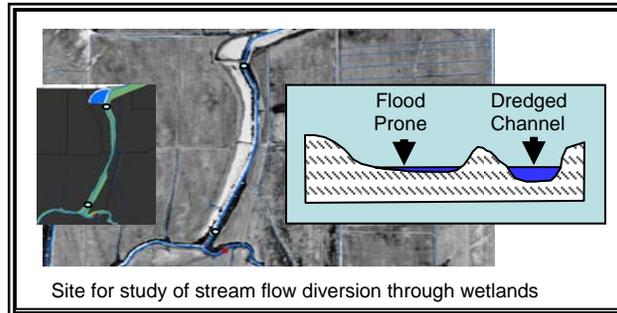
- Located in the Lower Mississippi River Valley (LMRV), Madison Parish, Northeastern Louisiana
- Consists of 43,867 acres of former canebreak, swamp, and bottomland hardwood forest converted to row crop agriculture
- Broad representation of agricultural crops (corn, cotton, rice, sorghum, soybeans, millet, wheat, sunflower, and timber)
- Soils consist of Mississippi River Alluvial Deposits.

Cabin-Teele Selection

The Cabin-Teele Sub-Watershed was selected because:

- Typical of the Lower Mississippi River Valley (LMRV) rural areas
- Broad representation of agricultural crops (corn, cotton, millet, rice, sorghum, soybeans, timber, and wheat)
- Classified as having impaired waters (high nutrient, pesticide, and sediment concentrations)
- Features a single, definable drainage outlet
- Broad land owner, multi-agency, and organizational interest and participation within the sub-watershed
- Has potential for stream flow diversions through wetland areas
- Selected (but not funded to date) as a CEAP (Conservation Effects Assessment Program) Watershed
- Selected as a showcase watershed by the State of Louisiana

Methods

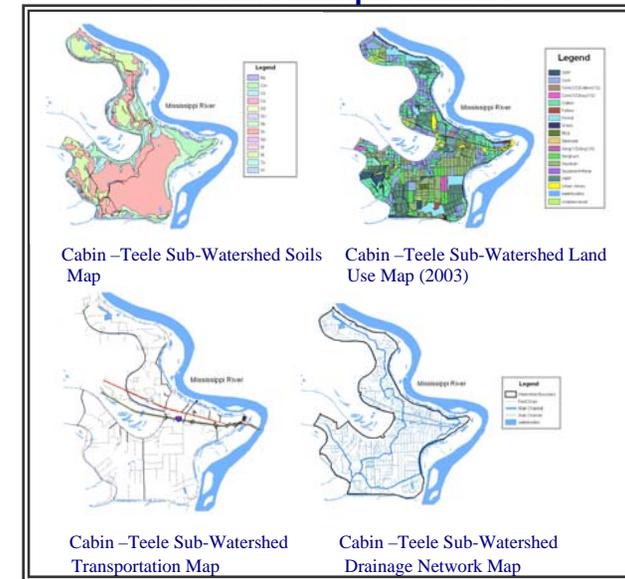


Determining the effects of BMPs on nutrients and sediments:

- Field BMPs will be implemented on selected fields and be evaluated by comparing to unimplemented fields
- Controlled drainage in field ditches will be implemented using flashboard risers and be evaluated by comparing to non-controlled drainage implemented sections

- Drainage through wetlands will be evaluated by measuring inflow and outflow nutrient and outflow nutrient and sediment concentrations
 - In-stream nitrate removal will be determined using nitrate depletion in surface water.
- Field BMPs targeting will be conducted using the AnnAGNPS continuous simulation model. Cost analysis will be conducted by comparison of all costs associated with each field BMP targeting scenario.

Current Accomplishments



Currently completed work by **USDA-ARS, Soil & Water Research**, in Cabin-Teele:

- Creation of an inventory database including the past ten years of land use records, fertilization records, crop characteristics, climate data, soil classification, drainage information
- Creation of certified field, drainage network, soil classification, and transportation maps of the Cabin-Teele
- Preliminary identification of BMPs suitable for implementation within the Cabin-Teele