LOWER ARKANSAS MISSISSIPI RIVER BASIN INITIATIVE (MRBI)

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INTRODUCTION

The Mississippi River Basin is the largest basin on the continent. It is widely recognized to be one of the most productive agricultural regions in the world. Arkansas, a state with 13.8million acres of total farmland, agriculture is the most important industry accounting for almost $16 billion of its total economy. Corn, soybeans, wheat, rice, and cotton along with animal production such as beef, pork, and poultry are some of the most prevalent commodities. Also, row crops are likely to be treated with fertilizers and pesticides. Rivers and streams, within the Mississippi River Basin, carry runoff form the agricultural areas downstream. Runoff from these upstream areas eventually empty into the Mississippi River which eventually discharges into the Gulf of Mexico. The water quality and quantity in the Mississippi River Basin is of great importance, nationally. As the production of agricultural crops increase in this area, it is very important that monitoring and data analysis plans be implemented aggressively.

The Natural Resources and Conservation Service(NRCS) has developed a program, the to measure water quality and quantity at a national scale. This project focuses on monitoring at Bayou Meto Watershed. Arkansas is one of the 13 states that is participating in this initiative.

We have installed automatic samplers at several privately owned farm sites (Lonoke & Jefferson counties) .

Monitoring will provide data for assessment of the effectiveness of cover crops used to control sediments and nutrients runoff from paired fields. We hope to see if best management practice will improve water quality and quantity which includes a decrease in the total sediments, nutrients ,and pollutants entering the surface water systems.

OBJECTIVES

By implementing best management practices (conservation systems approach), the MRBI is hoping to reduce 30% of nutrient and sediment loads entering streams as measured at edge of field . The specific project objectives are as follows:

1. Improved in-steam water quality
2. More efficient water use in irrigation systems.
3. Improved wildlife habitat environment.
4. Identify Wetland restoration opportunities within the watershed.

MONITORING DESIGN

Fig. 1 An ISCO 6712 Automatic Sampler is installed at all sites to automatically collect water samples once the threshold water flow is detected. Each monitoring station was equipped with a flow outlet structure (the open-channel pipe in the current situation). The outlet structure was outfitted with flow sensors, data loggers, and communication devices.

Fig. 2 An ISCO 6712 Automatic Sampler

Fig. 3 Lonoke County Site 2: Site has no open-channel pipe present. Runoff volume will be calculated from pressure transducer measurements and water depth with the appropriate equations for use with the trapezoidal weir.

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METHODOLOGY

Adjacent field sites of similar size (paired fields) with separate discreet runoff outlets were utilized for the control and treatment. Monitoring will be conducted for five years with two years of calibration before a cover crop treatment is implemented. Automatic water sampling will be triggered to collect based on threshold values of discharge with ISCO 6712 Automatic Samplers. Samples collected will be analyzed for nutrients and sediment concentrations after precipitation, storm water runoff and irrigation events. We will download the flow and precipitation data by using the RTD data logger. We will measure the volume of the composite sample in the sampling jar and place immediately on ice until laboratory analysis can be conducted. The samples will be analyzed for Nitrates, Nitrites, Nitrites, Ortho-phosphate, Total Nitrogen, Total Phosphorous, Suspended Sediment Concentration and Total Suspended Solids.

ANTICIPATED RESULTS

We hope to see measurable differences between fields where best management practices (bmps) were employed and plots where row crops were grown in the traditional fashion. We also hope to see measurable differences in both water quality and quantity among the control and treatment fields:

1. For Nitrates, Nitrites, Nitrites, Ortho-phosphate, Total Nitrogen, Total Phosphorous, Suspended Sediment Concentration and Total Suspended Solids.
2. For total sediments.
3. For water quantity

REFERENCES

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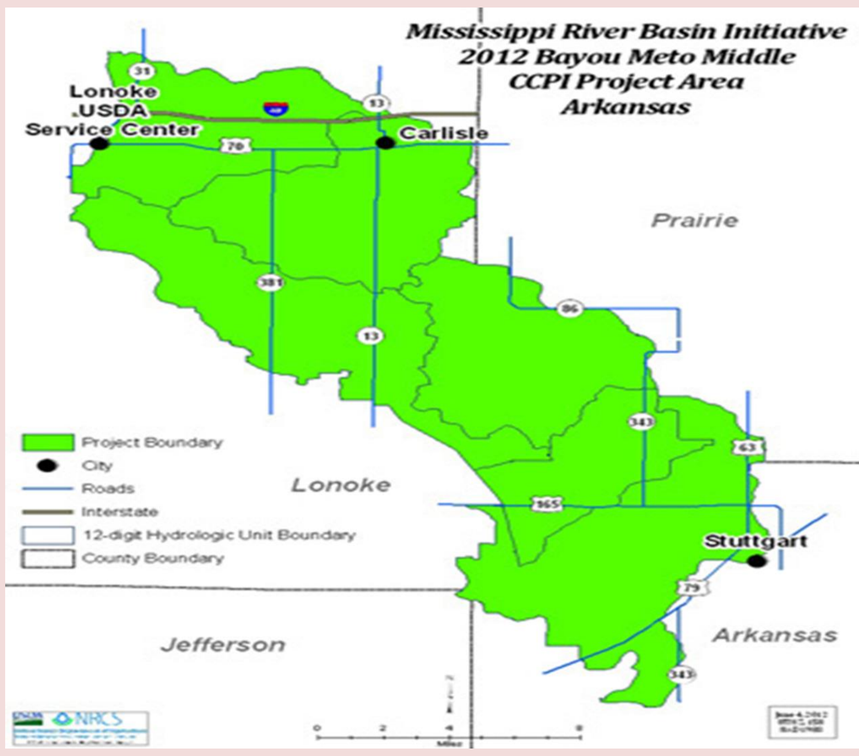

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