II. INTRODUCTION

The Mississippi River, America's greatest river, has the third largest drainage area in the world, exceeded in size only by the watersheds of the Amazon and Congo Rivers. It has, without question, played a major role in the physical and economical growth of the Nation. It is a navigation artery of great importance to the Nation's transportation system as well as a major supplier of water for the cities and industrial communities that have located along its bank. In its lower valley, the Mississippi River flows through one of the most fertile regions on earth. In recent years the recreational worth of this mighty river has increased tremendously. All of these factors point up the importance of the Mississippi River to the Nation's general economy and the economy of the lower valley.

But a river is a greater asset to navigation as a controlled river. Its waters form a navigation artery of tremendous worth as long as the channel is safe and dependable. A river is beneficial to the area through which it flows as long as it is made to work for the region and is not allowed to destroy it.

As a result of many years of work by the U.S. Army Corps of Engineers, the Mississippi River is being controlled in time of high water by levees and floodwalls which are designed to protect the alluvial valley against the project flood, except where it enters the natural backwater areas or is diverted purposely into floodway areas. Revetments have been utilized to minimize meanderings which would cut into and destroy protection levees and to provide a favorable channel alignment for navigation. Dikes

have been built to contract channel crossings, encourage closure of back channels and chutes, and to provide better channel alignment for navigation. Though not complete, these works have generally been very successful. However, the Mississippi River is a dynamic river, continually changing its bed configurations, moving bars and islands, making point bar cutoffs, and generally attempting to break out and resume its cross-valley wanderings.

Two major goals of Corps of Engineers work in the Lower Mississippi Valley are to produce and maintain a stable river system capable of safely conveying project flood flows to the gulf and to develop and maintain a safe and dependable navigation channel of authorized dimensions. Although tremendous strides have been made toward realization of these two goals, considerable work remains to be done.

The major flood on the Mississippi River in the spring of 1973 produced stages which made it apparent that the prevailing stage-discharge relationship was several feet higher than the stage-discharge relationship on which the levee grades and other flood control features had been based in the middle portion of the Lower Mississippi River and in the Atchafalaya Basin Floodway. In addition to deterioration problems observed during the 1973 flood, contraction works, revetments, and other features have aroused the concern of conservation interests and raised questions regarding flood flow capacities in the Upper Mississippi River. Also, excessive shoaling problems are occurring in the Lower Mississippi River below New Orleans, Louisiana. Questions have also been raised regarding the possibility of the deterioration problem migrating downstream and affecting the Baton Rouge to New Orleans reach of the river.

A revitalized and expanded potamology program designed to obtain a

better understanding of the mechanisms and relationships that give rise to large scale change in the regime of an alluvial river as a result of man-made modifications has been formulated, and this study covers a portion of the studies included in the expanded potamology program. This study has resulted in the compilation and processing of a large volume of data. In some cases, lack of data was apparent and in a few others, data were not available until too late to be included. It appears that detailed study of the data assembled would not only be desirable, but might reveal yet a better and clearer understanding of this many-faceted problem.

The areal extent of the study was that portion of the Mississippi River and the adjacent confined floodplain as required between Alton, Illinois and the Gulf of Mexico (Head of Passes), and including the Atchafalaya River. Study sites were selected to include locations of varying physical characteristics to provide sufficient coverages to represent the entire river.

Four districts of the Crops of Engineers were included: St. Louis, Memphis, Vicksburg and New Orleans. The jurisdiction of each district is as follows:

New Orleans-- Atchafalaya River and mile 0 to mile 320.5, above Head of Passes

Vicksburg--Mile 320.5 to mile 599.0, above Head of Passes

Memphis--Mile 599.0 to mile 954.0 at Cairo, Illinois*, above Head of Passes

St. Louis--Mile 0 at Cairo, Illinois to mile 202.0 at Alton, Illinois.

*Cairo, Illinois represents mile 0 for the St. Louis District and is at mile 954.0 above Head of Passes. River mileage downstream and upstream from Cairo is with respect to the 1929 datum.