Title: Planform Changes in the Pascagoula River and Tributaries, Mississippi

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ABSTRACT

This paper examines planform changes in the Pascagoula River and tributaries in southeastern Mississippi, and its relationship to natural factors and human modifications in the basin. Planform changes were examined on the Pascagoula River and for portions of the Leaf River, Chickasawhay River, Bowie River, Thompson Creek and other tributaries that are wide enough to have two banklines visible on multiple series of maps and aerial photography. The planform changes are evaluated for a minimum of three periods including historic maps from 1947-51 (partial coverage), aerial photographs from 1955-1960, maps from 1982-86, and digital orthoquadrangles from 1992-96. In this large basin, floodplain land use/land cover is diverse, including national forests, commercial forestry, mining, urbanization, and agriculture. Spatial patterns and temporal relationships of floodplain changes and channel instability will be used to evaluate which locations are most unstable, whether modified portions are experiencing more instability than less modified portions, and evaluate cause and effect interactions. To better quantify change, we have developed and applied various methods to determine migration and changes in channel morphology using Geographic Information Systems.

Our preliminary assessment suggests that, especially in the upper portions of the Leaf and Chickasawhay Rivers, there is more channel migration and cutoff formation in areas of high sinuosity and abundant sand bar area than in straight reaches with limited sand bar area. Such variations in sinuosity and sand bar formation, in turn, are likely influenced by geologic factors, including lithology and structure. Reaches with sand and gravel mining, either in the adjacent floodplain, channel or a major tributary, show more channel change than other land uses. Notable examples include the Bowie River, altered from direct mining of the channel bed and margins, the Leaf River, which shows changes just upstream of Hattiesburg and the confluence with the mined Bowie River, and Thompson Creek, where floodplain mining has facilitated channel change by pit diversions. Research on spatial patterns and temporal relationships of floodplain and channel changes is important it because channel instability has numerous ramifications to the environment and private and public properties. Elucidating and quantifying these relationships is important in defining and refining state regulations regarding floodplain activities.