REVISED MAPPING OF SURFACE FAULTS, EAST BATON ROUGE PARISH, LOUISIANA

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ABSTRACT

Previous investigations have shown that faults of the Baton Rouge system in south Louisiana are unlike most other onshore Gulf Coast growth faults in being active, in extending to the ground surface, and in showing little change in displacement over large depth intervals beneath the base of the Pleistocene. Based on these characteristics, investigators inferred geologically recent rejuvenation of older faults. Although some of these investigations produced detailed (1:24,000- or larger-scale) surface maps of the faults, the criteria for mapping the fault traces were either left unspecified or depended too heavily on potentially undiagnostic structural damage indicators.

A recent program undertaken to map the surface geology of East Baton Rouge Parish at 1:24,000 showed that geomorphic expression is the best overall criterion for interpreting the positions of these fault traces. The faults (especially the Baton Rouge fault) produce a clear topographic signature with relatively straight segments, regularly sloping fault-line scarps, and few indications of substantial embaying or colluviation, indicating that traces can best be mapped at the toes of the fault-line scarps in most places. Modification of fault-line scarps generally consists of little more than incision by small streams and reduction of slope angles by varying amounts along different fault segments, except where the Comite River flood plain follows the Denham Springs-Scotlandville fault. The geomorphic expression is diagnostic because (1) the faults are active, and (2) the late Pleistocene Prairie surface cut by the faults is in most places underlain by a stiff clay that is fairly competent at the surface. Thin (0.5 meter or less) colluvium discernible in places along the Baton Rouge fault is restricted to the updip edge of the downthrown block and overlaps Holocene depositional units, and thus implies deposition in response to Holocene movement along the fault.

Near-surface stratigraphic relations across these active fault zones, tested with shallow (10 meters and less) borings, corroborate surface displacement in places. In contrast, linear surface discontinuities in northern East Baton Rouge Parish have associated near-surface stratigraphic relations that are suggestive, but not diagnostic, of late Pleistocene faulting and contemporaneous deposition. Data from sparsely distributed, shallow borings on both sides of these discontinuities are equivocal because (1) younger Pleistocene units cut out older ones, so thicknesses and elevations may reflect erosion as well as structure, and (2) analysis must allow for the possibility of surface rollover structures whose crests may reach elevations comparable to the elevations of the upthrown blocks. Additionally, the topographic signatures of these surface discontinuities are much less clear than those of the active faults. Whether this means that the discontinuities are inactive faults, that they are non-fault cut-and-fill features associated with the formation of coast-parallel terrace surfaces, or that they are some combination of the two (*e.g.*, structurally influenced cut-and-fill features) is a subject of continuing investigation.

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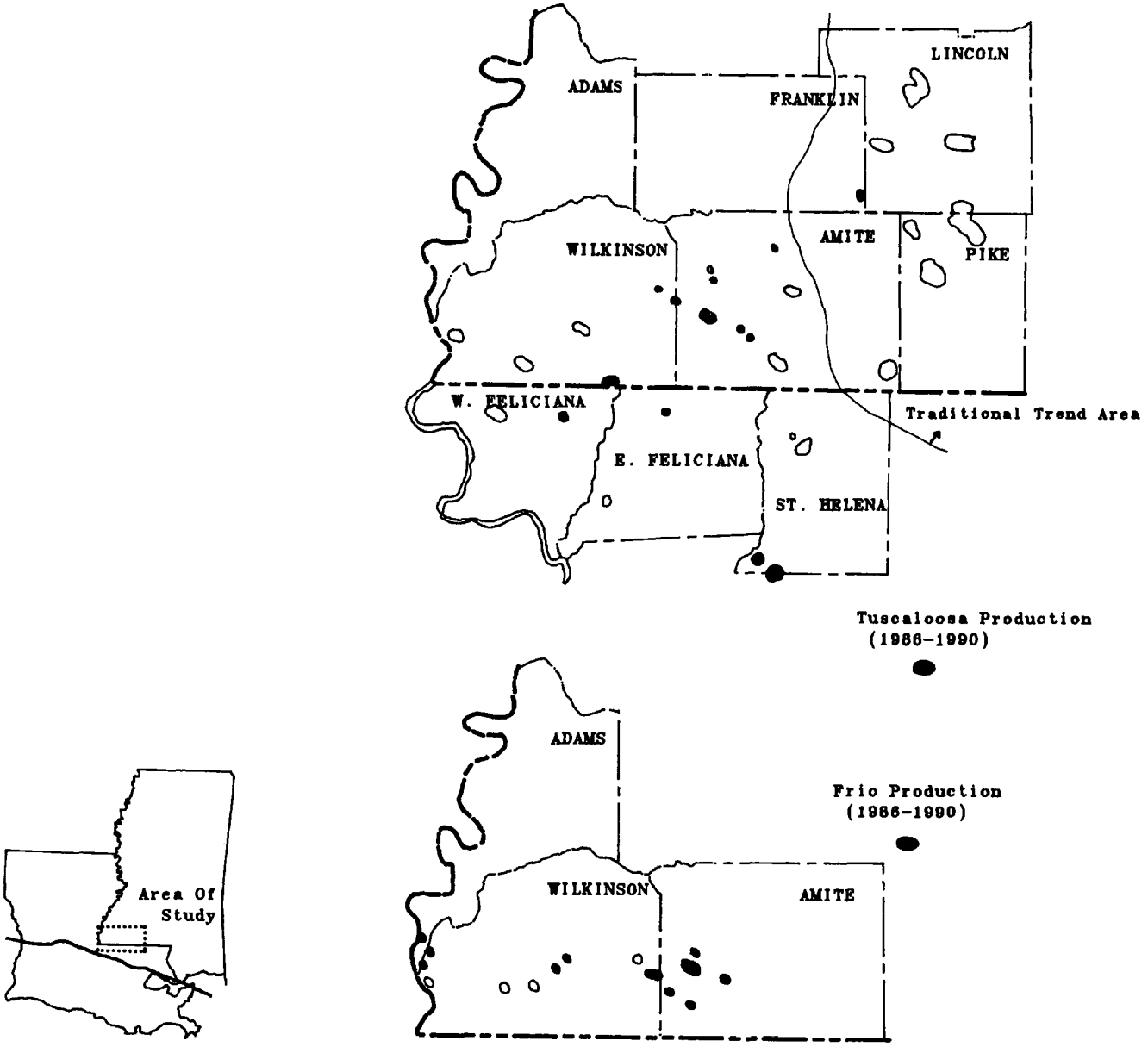

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