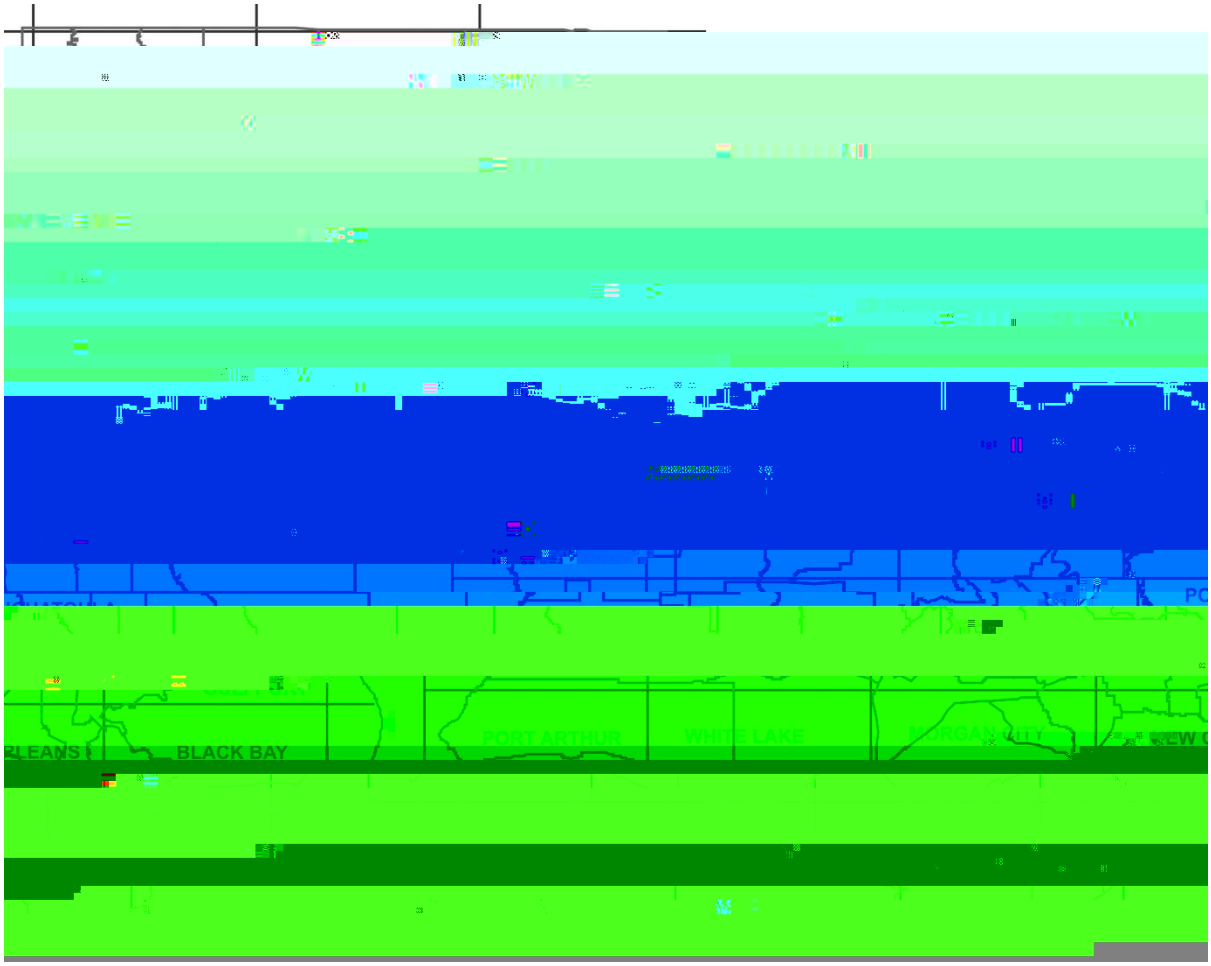
Geology of the Pride 7.5-Minute Quadrangle, LA

Louisiana Geological Survey

Introduction, Location, and Geologic Setting

The Pride 7.5-minute quadrangle lies within the Plio–Pleistocene uplands east of the lower Mississippi River valley, in the drainage basin of the Amite River in the southeastern Louisiana coastal plain (Figures 1, 2). The axis of the subsurface lower Cretaceous shelf edge (Toledo Bend flexure), which trends west-northwest to east-southeast, lies directly beneath the study area. The surface comprises strata of (1) the Pliocene Citronelle Formation, Upland allogroup, characterized by the highest elevations and deeply dissected ridge-and-ravine topography lacking any original constructional landforms; (2) the Pleistocene Montpelier alloformation, Intermediate allogroup, underlying dissected but recognizable terrace surfaces along the the Amite River valley at elevations lower than the Citronelle; and (3) the Pleistocene Prairie Allogroup, at yet lower elevations, comprising an older and higher subunit (Irene alloformation) and the extensive, younger and lower Hammond alloformation, each characterized by a preserved depositional surface with indistinct constructional topography. These Plio–Pleistocene strata are covered by

subsoil with hand-operated probes and examine and sample the texture and composition of the surface-geologic map units. Field observations were then synthesized with the draft surface geology to prepare an updated integrated surface geology layer for the 7.5-minute quadrangle.



1. Location of Pride 7.5-minute quadrangle, southeastern Louisiana.

2. Surface geology of Pride 7.5-minute quadrangle and vicinity (adapted from McCulloh et al., 2009). (**$P_o$uc**, Citronelle Formation, Upland allogroup (Pliocene); **Pimo**, Montpelier alloformation, Intermediate allogroup (Pleistocene); **Ppi**, Irene alloformation, Prairie Allogroup (Pleistocene); **Pph**, Hammond alloformation, Prairie Allogroup (Pleistocene); **Pp**, Prairie Allogroup, undifferentiated (Pleistocene); **Hua**, Holocene undifferentiated alluvium.)

QUATERNARY SYSTEM

HOLOCENE

Hua Holocene undifferentiated alluvium

PLEISTOCENE

LOESS
[pattern] Peoria Loess

PRAIRIE ALLOGROUP
Pp Prairie Allogroup, undifferentiated
Pph Hammond alloformation
Ppi Irene alloformation

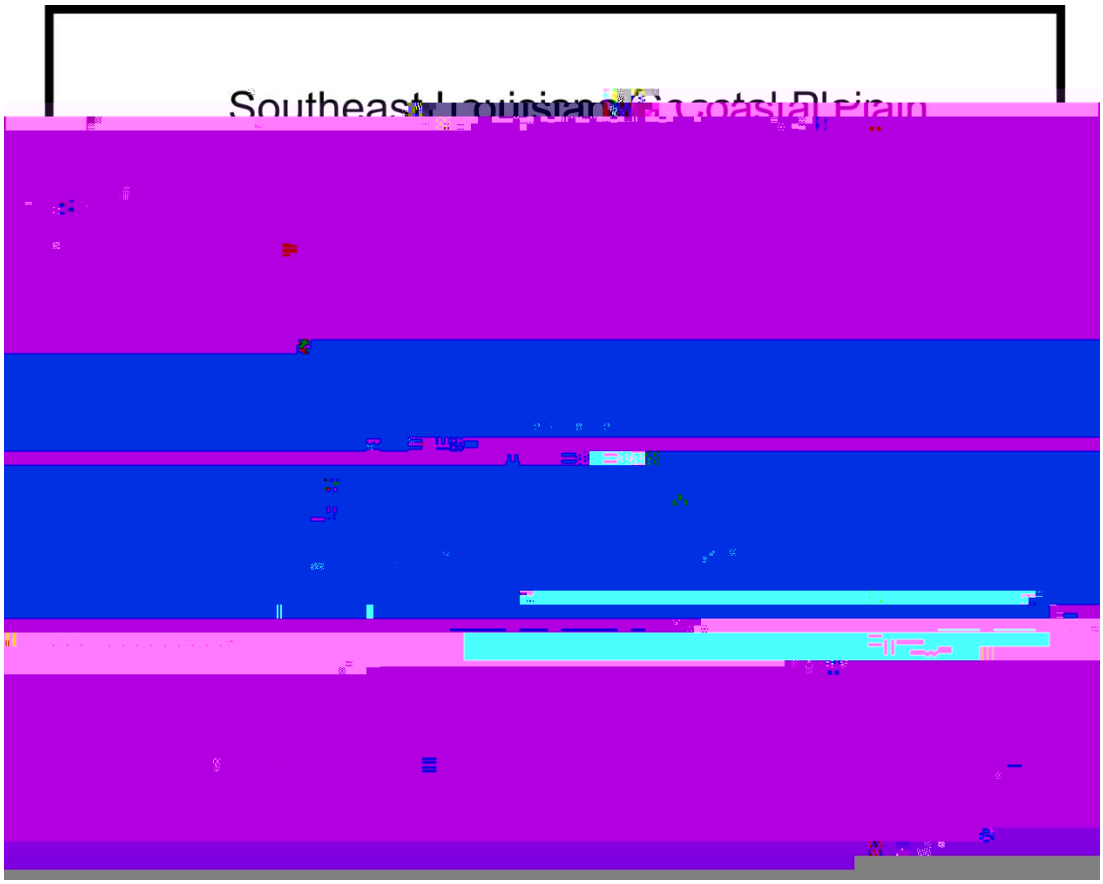
INTERMEDIATE ALLOGROUP
Pimo Montpelier alloformation

TERTIARY SYSTEM

PLIOCENE

UPLAND ALLOGROUP
$P_o$uc Citronelle Formation

3. Units mapped in the Pride 7.5-minute quadrangle.



4. Correlation of strata mapped in the Pride 7.5-minute quadrangle.

Allostratigraphic Approach to Pleistocene Unit Definitions

In the late 1980s the LGS had begun exploring the application of allostratigraphic concepts and nomenclature to the mapping of surface Plio–Pleistocene units (e.g., Autin, 1988). In Louisiana these units show a series of geomorphic attributes and preservation states correlative with their relative ages, which eventually led LGS to conclude that allostratigraphy offers an effective if not essential approach to their delineation and classification (McCulloh et al., 2003). The Plio–Pleistocene strata for which allostratigraphic nomenclature presently has value to LGS all are situated updip of the hinge zone of northern

Within the region of the Pride 7.5-minute quadrangle, the Citronelle Formation consists largely of reddish brown sands, interbedded sands and gravels, and gravels. Paralleling the course of the modern Amite River is a well-defined gravelly trend composed largely of gravelly sands, sandy gravel and muddy sands. The gravel content of these sediments decreases and their clay content increases gulfward. The coarse-grained nature of the Citronelle contrasts greatly with the finer-grained overlying and underlying units. The gravels

the edge of the deeply eroded Citronelle Formation. The surface of the Montpelier alloformation is too fragmented for its slope to be calculated within the study area.

Prairie Allogroup, undifferentiated (Pleistocene)

The Prairie Allogroup is a collection of late Pleistocene depositional sequences of alloformation rank (Autin et al., 1991; Heinrich, 2006). The sediments of the Prairie Allogroup accumulated within a diverse suite of coastal-plain settings, i.e., fluvial (meander-belt and backswamp), colluvial, possibly eolian, estuarine, deltaic, and shallow-marine environments. These largely fine-grained sediments accumulated over a considerable part of the late Pleistocene (Sangamon to Wisconsin) (Autin et al., 1991; Otvos, 2005; McCulloh et al., 2003; Heinrich, 2006).

The surface of the Prairie Allogroup forms a coastal terrace along the northwest coast of the Gulf of Mexico from a point about 110 km (~70 mi) south of the Rio Grande within M

the best-

The surface of the Pride quadrangle comprises strata of the Pliocene Citronelle Formation, and Pleistocene stratigraphic units of the Intermediate and Prairie allogroups consisting of sediment deposited by the Amite River and by coastal processes. The Montpelier alloformation, Intermediate allogroup, and the Irene and Hammond alloformations of the Prairie Allogroup, form part of a coast-parallel belt of terraced Pleistocene strata. These Plio–Pleistocene strata are covered by late Pleistocene Peoria Loess up to slightly greater than 1 m thick. Holocene strata comprise undifferentiated alluvium of the Amite River and its tributaries.

The geologic map of Pride quadrangle provides basic geologic data of potential value to the conduct of aggregate-mining activities in the Amite River flood plain. The area hosts sizable sand and gravel resource potential in Holocene floodplain sediment, Pleistocene strata of the Prairie and Intermediate allogroups, and Pliocene sediment of the Citronelle Formation (Heinrich and McCulloh, 1999). The area has produced significant sand and gravel in the past decade (U.S. Geological Survey, 2011), and production activities have moved progressively northward in recent years. The 1:24,000-scale surface-geologic map of the study area also should serve efforts at protection of the Southern Hills aquifer system in the upper Amite River area.

Acknowledgments

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