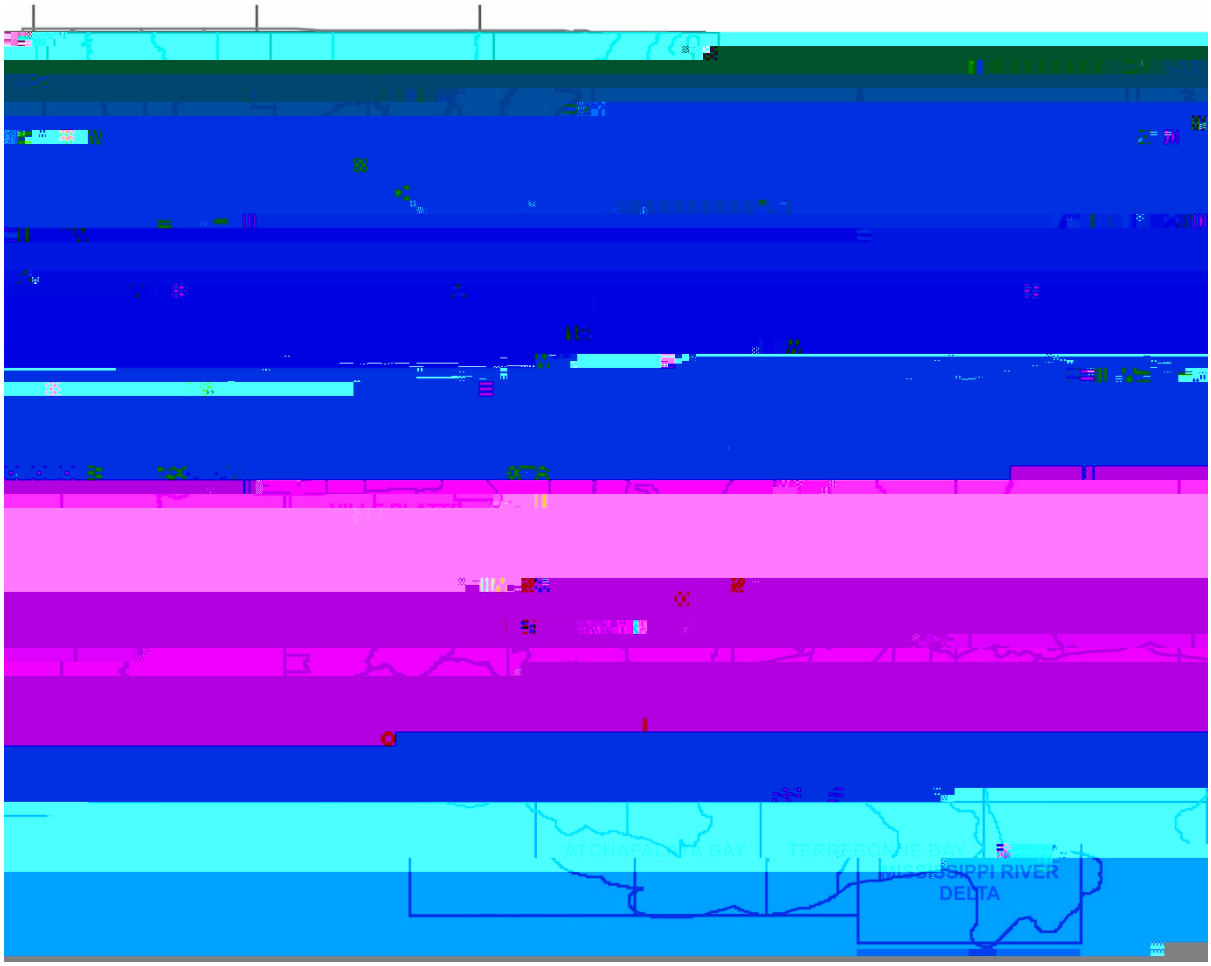
prompted numerous previous groundwater investigations. Most recently, Tomaszewski et al. (2002) detailed groundwater conditions pertinent to the Chicot aquifer; Milner and Fisher (2009) chronicled in detail the geological framework and groundwater hydrology of the aquifer; and Van Biersel and Milner (2010) summarized the aquifer's distribution, recharge area, proportions of water-use categories, and pumpage rates.

Methods

The investigators reviewed legacy information and made new interpretations consulting remotely sensed imagery (comprising aerial photography, lidar DEMs, and other sources) and soils databases published by the Natural Resources Conservation Service (NRCS) to develop a draft surface geology layer for the study area. Field work was conducted to access the subsoil in road- and drainage-associated excavations, to 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 Breaux Bridge 7.5-minute quadrangle, southeastern Louisiana.

2.

QUATERNARY SYSTEM

HOLOCENE

Hua	Holocene undifferentiated alluvium
Hb	Backswamp deposits
Hml_3u	Natural levee complex of Mississippi River meander belt 3, upper deposits
Hmm_3u	Mississippi River meander belt 3, upper deposits
Hmc_3u	Crevasse complex of Mississippi River meander belt 3, upper deposits
Hrm	Meander-belt of the Teche course of the Red River
Hmm_3l	Mississippi River meander belt 3, lower deposits
Hml_3l	Natural levee complex of Mississippi River meander belt 3, lower deposits
Hmd_3l	Distributary complex of Mississippi River meander belt 3, lower deposits

PLEISTOCENE

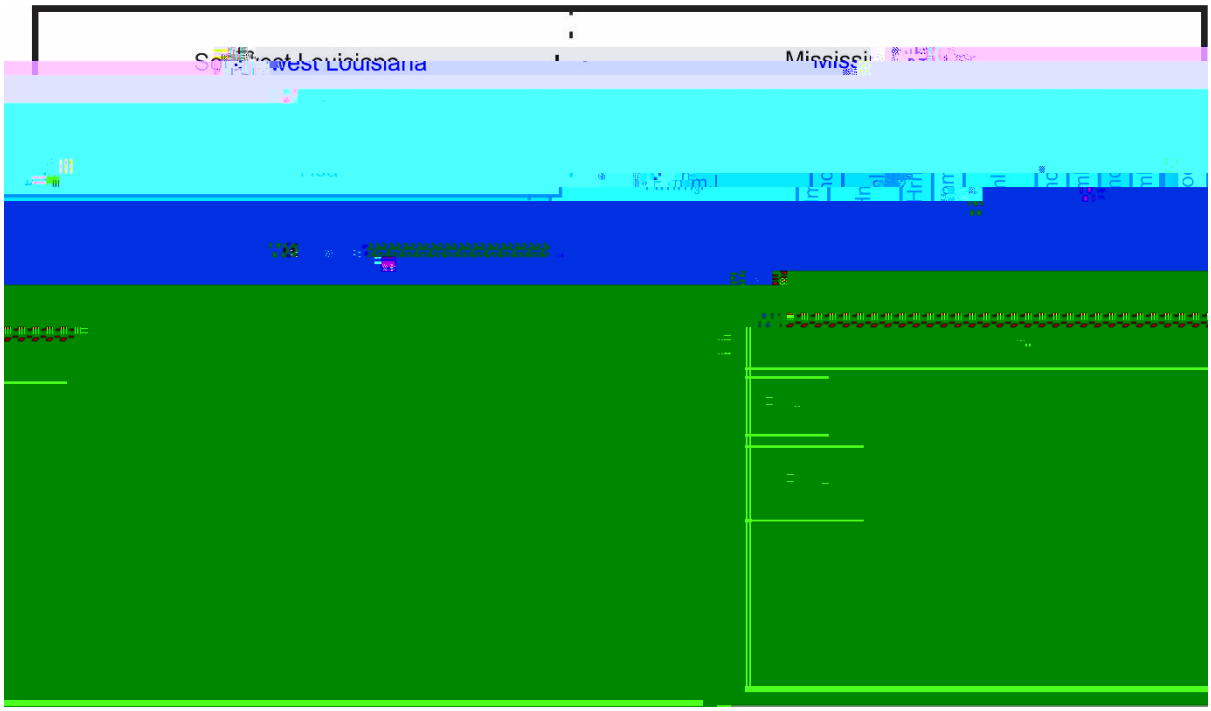
LOESS

[pattern]	Peoria Loess

PRAIRIE ALLOGROUP

Ppbcu	Upper Big Cane alloformation
Ppbcl	Lower Big Cane alloformation
Ppav	Avoyelles alloformation
Ppbe	Beaumont Alloformation

3. Units mapped in the Breaux Bridge 7.5-minute quadrangle.



4. Correlation of strata mapped in the Breaux Bridge 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; McCulloh, 2013). The Plio–Pleistocene strata for which allostratigraphic nomenclature presently has value to LGS all are situated updip of the hinge zone of northern Gulf basin subsidence, and show a clear spectrum of preservation from pristine younger strata to trace relicts and remnants of older strata persisting in the coastal outcrop belt and on high ridgetops in places updip of it. Allounit nomenclature has figured heavily in the STATEMAP-funded geologic mapping projects of the past two decades because Quaternary strata occupy approximately three-fourths of the surface of Louisiana. The surface of the Breaux Bridge quadrangle consists exclusively of Quaternary strata, which dictated a continuation of this practice for this investigation.

Beaumont Alloformation, Prairie Allogroup (Pleistocene)

The Beaumont Alloformation (**Ppbe**), known originally as the Beaumont Clay, is a regionally extensive coastal-plain unit extending westward from the western valley wall of the Mississippi River alluvial valley past the Rio Grande to the Tamaulipas Range in northeastern Mexico. Locally, adjacent to its eastern edge, it is blanketed by over 2 m of overbank deposits of the Avoyelles alloformation from the Lafayette meander belt and up to 5 m of Peoria Loess. Both the overbank deposits and loess thin rapidly westward from the Mississippi alluvial valley. The lower contact of the Beaumont Alloformation is a regionally and laterally extensive flooding surface and correlative unconformity that is correlated with the *Trimosina A* micropaleontological zone (~0.6 Ma) offshore. The uppermost sediments of the Beaumont Alloformation have yielded optically stimulated luminescence (OSL) dates between about 90 and 110 ka.

As indicated by its original name, the Beaumont Alloformation is predominantly fine-grained and consists regionally of varicolored, laminated to massive, calcareous silty clays that in many places contain calcareous nodules and sandy fluvial bodies. Locally, it consists of gray, tan, brown, and red clay, silt, and sand, in places with Fe nodules (circa 2 mm). Subsurface data indicate that in its upper 80+ m the unit in places shows a transition from fining-upward gravel, overlain by coarse sand and gravel, to fining-upward sand (coarse to fine) and clay atgravel, overlain

The surface of the Avoyelles alloformation (**Ppav**) consists of a complex of relict paleochannels and paleocourses of the Mississippi River known as the Lafayette meander belt. The surface of this meander belt is covered by 2 to 5 m of Peoria Loess. The base of the Avoyelles alloformation is assumed to be a fluvial composite scour surface created by the lateral migration of the Pleistocene Mississippi River.

The Avoyelles alloformation consists of two major units. The upper unit consists of 1.5 to 6 m of gray, tan, and brown clay, silt, and sand, in places calcareous and/or carbonaceous, or with clay pockets, silt seams, laminae of clayey silt and sand, sand layers, organic matter, iron-oxide stains and/or nodules (less than or equal to 2 mm), and brown mottles. The lower unit consists of upward-fining sand that contains sparse ripple and parallel laminations and interbeds of silty loam. Judging from water well records, the lower unit has a maximum thickness of about about 30 m. Locally, the sediments of the Avoyelles alloformation have been OSL dated between about 45 and 55 ka.

The surface of the Avoyelles alloformation exhibits well-defined, relict, ridge-and-swale topograpy of a prehistoric Mississippi River. The expression of this relict fluvial topography has been obscured by surficial processes and masked by the accumulation of Peoria Loess and later overbank sedimentation from the adjacent Mississippi River.

Big Cane alloformation, Prairie Allogroup (Pleistocene)

The Big Cane alloformation consists of two units: a thicker lower unit (**Ppbcl**) composed of brown silty sand, sand, and gravelly sand, occupying higher elevations, and a thinner upper unit (**Ppbcu**

Peoria Loess is a regionally extensive unit associated with the Mississippi River drainage

The geologic map of Breaux Bridge quadrangle provides basic geologic data of potential value to future aggregate exploration and production in Pleistocene strata of the Prairie Allogroup. Sand and gravel previously have been produced from the Beaumont Alloformation in the adjoining Carencro quadrangle in northern Lafayette Parish directly to the west (U.S. Geological Survey, 2011); the Avoyelles and Big Cane alloformations are sand-rich near the surface and may have potential to become a sand resource. The 1:24,000-scale surface-geologic map of the study area also should serve efforts at protection of the Chicot aquifer in the greater Lafayette area.

Acknowledgments

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