Geology of the Buhler 7.5-Minute Quadrangle, LA

Louisiana Geological Survey

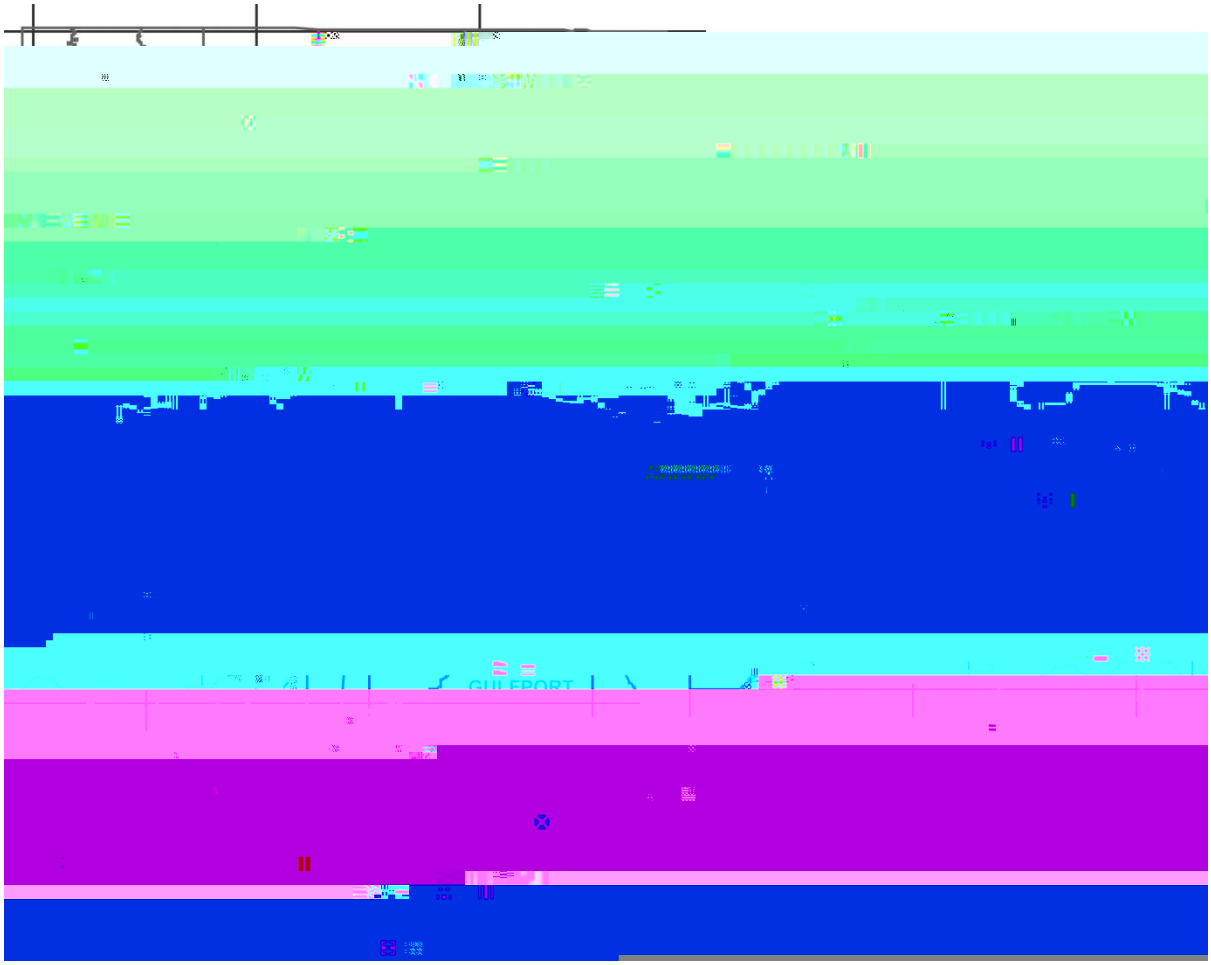
Introduction, Location, and Geologic Setting

The Buhler 7.5-minute quadrangle lies in the southwestern portion of the south Louisiana coastal plain (Figure 1), in the drainage basin of the Calcasieu River. The quadrangle lies at the northern edge of the Gulf Coast salt basin, near the southern edge of coast-parallel outcrop belts of terraced Pleistocene strata comprising Intermediate, Prairie, and Deweyville allogroups (Lissie and Beaumont alloformations, and Deweyville Allogroup undifferentiated, respectively). Its surface consists exclusively of Holocene and terraced Pleistocene strata (Figure 2) deposited by the Sabine, Red, and Calcasieu rivers. All these strata consist of terrigenous sediment with varying proportions of sand, silt, mud, and/or gravel.

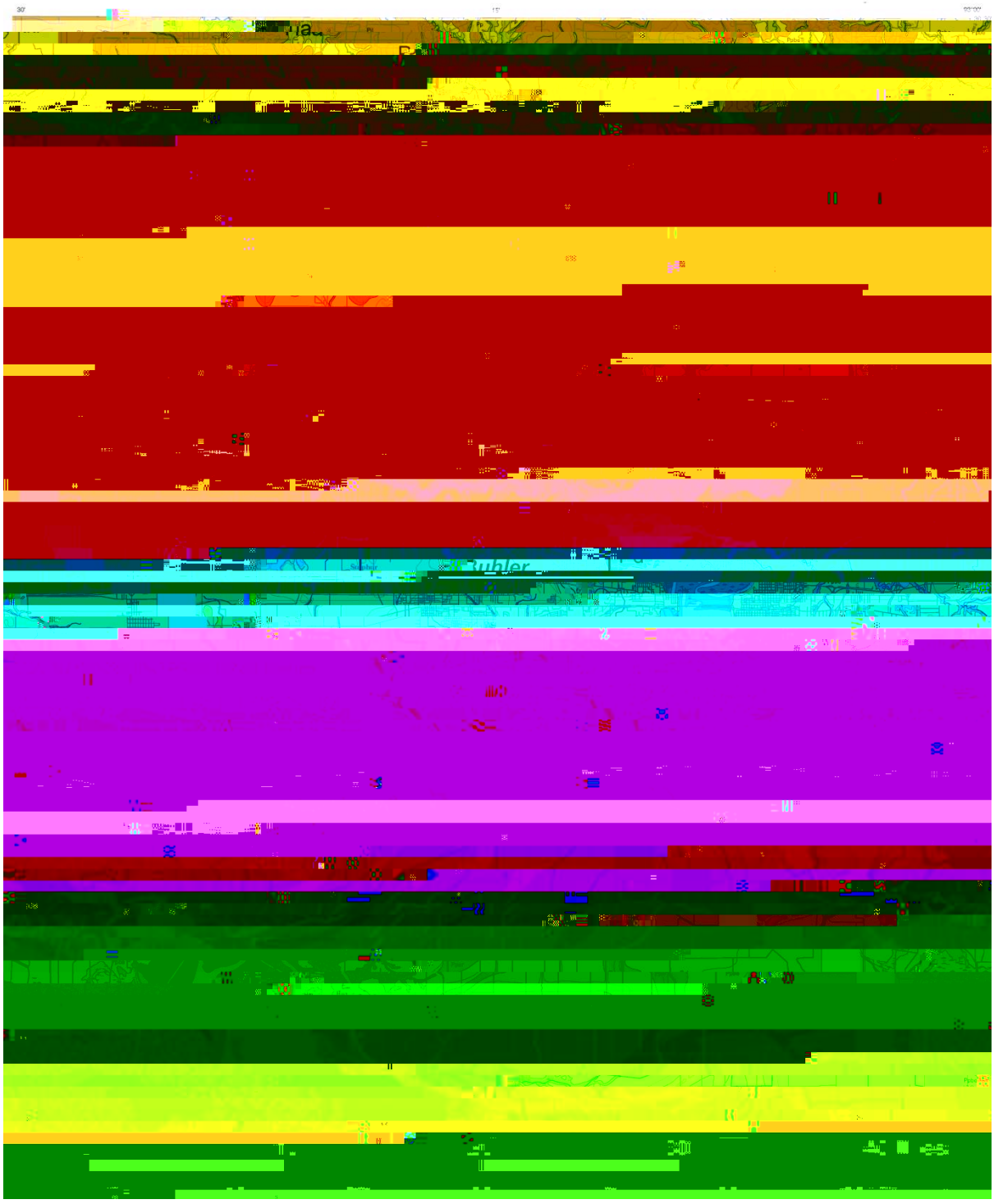
Features developed on the surface of the Beaumont Alloformation comprise the Houston ridge, easternmost segment of the Ingleside barrier trend (Figure 2), and other coastal ridges of potentially diverse origins; one set of prominent coastal ridges within the study area appears to comprise relict natural levees of either the Sabine River or a minor intrabasinal stream. The area is transected by the traces of growth faults reactivated since the late Pliocene by depositional loading induced by voluminous sedimentation accompanying continental deglaciation (Heinrich, 2005; McCulloh and Heinrich, 2012).

The units recognized and mapped in this investigation are summarized in Figures 3 and 4.

surface geology to prepare an updated integrated surface geology layer for the 7.5-minute quadrangle.



1. Location of Buhler 7.5-minute quadrangle, southwestern Louisiana.



2. Surface geology of the area encompassing the Buhler 7.5-minute quadrangle (excerpted and adapted from Heinrich et al., 2002). (**Pil**, Lissie Alloformation, undifferentiated; **Pio**, Oakdale alloformation; **Ppbe**, Beaumont Alloformation; **Ppei**, Relict Pleistocene barrier ridge (Houston ridge); **Pper**, Relict Pleistocene ridges; **Pd**, Deweyville Allogroup, undifferentiated; **Hm**, Mermentau Alloformation; **Hs**, Small river deposits, undifferentiated; **Hua**, Holocene undifferentiated alluvium).

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 PlioïPleistocene 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 PlioïPleistocene 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 preponderance of Quaternary strata in the present study area dictated continuation of this practice for this investigation.

Lissie Alloformation (Intermediate Allogroup)

The Lissie Alloformation is an unconformity-bounded stratigraphic unit that is separated from the underlying Willis Formation and the overlying Beaumont Alloformation by regional unconformities that have been defined and mapped by Young et al. (2012). Beneath this part of Louisiana coastal plain, these authors found that the Lissie Alloformation consists predominantly of 120ï

correlated with micropaleontological zones offshore and updip as far as possible. These sediments accumulated as short depositional episodes during multiple high-frequency glacio-

References

Aronow, S., 1986, Surface geology of Calcasieu Parish: Louisiana Geological Survey, Open-file report, no. 04ï01 (prepared from unpublished report on file with U. S. Department of Agriculture, Natural Resource Conservation Service, Alexandria, Louisiana).

Autin, W. J., 1988, Mapping alloformations in the Amite River, southeastern Louisiana: Geological Society of America Abstracts with Programs, v. 20, no. 4, p. 252.

Barrilleaux, J., 1986, The geomorphology and Quaternary history of the Houston barrier segment of the Ingleside strandplain, Calcasieu Parish, Louisiana: M.S. thesis, University of Southwestern Louisiana, Lafayette.

Blum, M. D., R. A. Morton, and J. M. Durbin, 1995, ñDeweyvilleò terraces and deposits of the Texas Gulf Coastal Plain: Gulf Coast Association of Geological Societies Transactions, v. 45, p. 53ï60.

Fisk, H. N., 1948, Geological investigation of the lower Mermentau River basin and adjacent areas in coastal Louisiana: unpublished ñDefinite project report,ò Mermentau River, Louisiana, Appendix II, U.S. Army Corps of Engineers, Mississippi River Commission, Vicksburg.

Graf, C. H., 1966, The late Pleistocene Ingleside barrier trend, Texas and Louisiana: M.S. thesis, Rice University, Houston, Texas.

Haque, S. M., 1984, Ground-water quality in the Lake Charles area, Louisiana: Louisiana Geological Survey, Water resources series no. 2, 57 p.

Harder, A. H., C. Kilburn, H. M. Whitman, and S. M. Rogers, 1967, Effects of ground-water