QUATERNARY GEOLOGIC MAP OF THE WHITE LAKE 4° x 6° QUADRANGLE, UNITED STATES

QUATERNARY GEOLOGIC ATLAS OF THE UNITED STATES
MAP I–1420 (NH–15)

State compilations by
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NOTE: This map is the product of collaboration of State geological surveys, universities, and the U.S. Geological Survey, and is designed for both scientific and practical purposes. It was prepared in two stages. First, separate maps and map explanations of the parts of States included in the quadrangle were prepared by the State compilers indicated on the inset diagram, Areas of Responsibility. Second, these maps were combined, integrated, locally supplemented, and related to a uniform map symbol classification. The map unit descriptions also were combined, supplemented, and coordinated with those of other maps of this series so that individual unit descriptions are applicable throughout both this map and all other maps of the series. Diagrams accompanying the map were prepared by the editors.

Differences in mapping or interpretation in different areas were resolved by correspondence to the extent possible. Most simply reflect differences in available information or differences in philosophies of mapping. Such differences serve to encourage further investigation.

Less than forty percent of the surficial deposits of the United States have been mapped and described. Traditionally, mapping of surficial deposits has been focused on glacial, alluvial, eolian, lacustrine, and marine deposits. Slope and upland deposits have been mapped in detail only in restricted areas. However, an enormous amount of engineering construction and many important problems of land use and land management are associated with regions that have extensive slope and upland deposits (colluvium, and residuum for example). These materials have many different physical characteristics. Therefore, an effort has been made to classify, map, and describe there deposits, based in large part on unpublished interpretations of individuals, published and unpublished subsoil data, and the distribution of bedrock parent materials. The classification is crude, but represents a first step toward a more refined and useful product.

For scientific purposes, the map differentiates Quaternary surficial deposits on the basis of a combination of criteria, such as lithology, texture, genesis, stratigraphic relationships, and age, as shown on the correlation diagram and indicated in the map unit descriptions. Some geomorphic features, such as dune ridge, are distinguished as map units. Erosional features, such as stream terraces, are not distinguished, and differentiation of sequences of alluvial deposits of different ages is rarely possible at a scale of 1:1,000,000.

For practical purposes, the map is a surficial materials map, on which materials are distinguished on the basis of texture, composition, and local specific characteristics such as swelling clay. It is not a map of soils as soils are recognized and classified in pedology or agronomy. Rather it is a generalized map of soils as recognized in engineering geology, or of subsoils or parent materials from which pedologic and agronomic soils are formed. As a materials map it serves as a base from which a wide variety of derivative maps for use in planning engineering, land use, or land management projects can be compiled.

The map contains the following illustrations:

- An index map to the International Map of the World 1:100,000 topographic series showing the Quaternary geologic map of the White Lake 4°x 6° quadrangle and other published maps of the Miscellaneous Investigations Series (I–1420).
- An illustration showing the responsibility for State compilations.
- An illustration showing the correlation of map units.
- An illustration showing loess distribution and thickness.

An illustration showing ancestral and present deltas of the Mississippi River.

LIST OF MAP SYMBOLS

CONTACT

FAULT—Bar and ball on downthrown side

BEACH AND DUNE RIDGE

TEPHRA LOCALITY—Pearlette family, undifferentiated

f—ARTIFICIAL FILL

DESCRIPTION OF MAP UNITS

HOLOCENE

asa ALLUVIAL GRAVELLY SAND—Light-gray, yellowish- or brownish-gray, locally reddish orange, coarse to fine sand and subangular to well-rounded pebble gravel; poorly to well sorted, poorly to well stratified, locally clayey. Deposit includes interbedded or admixed silt and clay, especially in flood plains of major drainages. Gravel is chiefly chert and (or) quartz; present in point-bar, stream-channel, and low terrace deposits. It is commonly derived from older gravel units. Mapped areas include local natural levee deposits of silt and clay (**fl**), organic muck, and swamp deposits on flood plains, and colluvium along margins of valley floors. Thickness 3–30 m

aca ALLUVIAL CLAY—Light- to dark-gray, yellowish-gray, or brownish-gray clay, silty clay, and organic clay. Includes abundant organic matter as disseminated particles, peat layers, and large wood fragments. Also includes minor thin layers of medium to fine quartz sand and, locally, fine chert-pebble gravel. Deposit underlies abandoned meander channels and overbank flood areas adjacent to natural levees of Mississippi River and other major rivers. Along lower valleys of Mississippi and Atchafalaya Rivers, deposit is predominantly backswamp organic clay and silt. Thickness 3–20 m; locally 30 m where deposit fills paleochannels in underlying Pleistocene fluvial sand and gravel

fl NATURAL LEVEE SILT AND CLAY—Brown to grayish-brown, light- to medium-gray silt and silty clay containing small amounts of fine sand, chiefly quartz; parallel- and wavy-laminated clay and silt deposits locally contain abundant plant fragments; climbing ripple cross-laminations are common. Deposit forms broad natural levees 2–5 m high along present and former courses and distributaries of the Mississippi River and other major rivers. Levee deposits slope gently away from river channel, merging imperceptibly with backswamp deposits. Thickness 1–4 m; as much as 8 m along Mississippi River west of New Orleans

hpc FRESHWATER-MARSH PEAT AND CLAY—Gray to black herbaceous peat and clay, intermixed and interbedded; color darkens as content of organic matter increases. Includes interbedded freshwater and brackish-water carbonaceous clays characterized by layers disrupted by root casts and calcareous nodules. Widespread on the Mississippi River delta plain and Louisiana chenier plain (Chabrek and Linscombe, 1978). Thickness 1–5 m

hps SALINE-MARSH DEPOSIT—Gray to black herbaceous peat and carbonaceous clay intermixed and interbedded. Color darkens as content of organic matter increases. Interbedded with soft clay, clayey silt, and sandy silt; burrowed; shells locally abundant. Includes saline and brackish-water deposits of the Mississippi River delta plain and the Louisiana chenier plain (Chabrek and Linscombe, 1978). Thickness 2–8 m

hmu FRESHWATER-, BRACKISH-, AND SALINE-MARSH SILT AND CLAY, UNDIFFERENTIATED—Gray to black, blue, or green herbaceous silt and clay intermixed and interbedded; local thin sand layers. Includes organic-rich deposits of freshwater-, brackish-, and saline-marsh environments. Mapped only in Texas. Thickness 0.25–3 m

ba BEACH SAND—White to light-gray, well-sorted, fine sand, chiefly quartz. Deposit occurs along seaward beaches of Timbalier Island and Isles Dernieres where it overlies coastal saline-marsh deposits (**hps**). Deposit is the wave-reworked part of a 20– to 30–m-thick layer of prograding delta-front sand. Also forms outer margin of the present Atchafalaya River delta. Mapped only in Louisiana. Thickness 0.5–3 m

bb BEACH SAND AND SHELL SAND—White to light-gray, well-sorted, fine quartz sand; abundant shells and shell fragments. Deposit forms beaches, spits, and barrier bars along Texas coast, and beaches along seaward margin of saline-marsh deposits (**hps**) in western Louisiana. Also forms beach and dune ridges on saline-marsh (**hps**) and freshwater-marsh (**hpc**) deposits in western Louisiana. In Texas, deposit commonly covered by locally active sand dunes. Thickness of modern beach deposit 1–12 m. Thickness of landward beach- and dune-ridge deposit 2–8 m

bc BEACH SHELL-FRAGMENT AND SHELL SAND—White to light-gray shell-fragment and shell sand, including minor amounts of fine quartz sand, silt, and clay. Occurs mostly along shore of Point Au Fer Island at southwestern margin of Mississippi River delta in Louisiana. Thickness 1–3 m

bd BEACH MUD—Gray to black silt and clay; color darkens as amount of organic matter increases. Deposit forms narrow beaches bordering saline-marsh (**hps**) and freshwater-marsh (**hpc**) deposits, and Lake Pontchartrain. Mapped only in Louisiana. Thickness 0.5–2 m

ml LAGOON AND TIDAL-FLAT SILT AND CLAY—Light- to dark-gray silt, clay. and very fine sand intermixed and interbedded; includes marine and local eolian deposits on tidal flats, tidal deltas, and washover fans along inland margin of barrier beaches. Mapped only in Texas. Thickness 0.5–2 m

HOLOCENE AND LATE PLEISTOCENE

afa ALLUVIAL-FAN DEPOSIT—Yellowish- to brownish-gray, locally reddish orange gravel, coarse to medium sand, and minor silt and clay, intermixed and interbedded; structureless to poorly bedded. Pebbles and sand chiefly chert and quartz, derived from Tertiary sediments. Mapped only in Texas. Thickness 1–5 m

LATE PLEISTOCENE

acb ALLUVIAL CLAY AND SILT (Deposits of Deweyville terrace of Bernard, (1950)—Light- to medium-gray clay and silty clay; poorly to well sorted, poorly to well bedded. Locally includes some admixed or interbedded fine quartz sand. Mapped only along Sabine and Calcasieu River drainages in Louisiana. Thickness 3–5 m

asb ALLUVIAL GRAVELLY SAND (Deposits of "Braided stream terraces" of Saucier, 1974)—White to gray or brown, poorly to well-sorted, fine to coarse sand and gravel; chiefly quartz. Includes minor silt and clay. Consists of both outwash and alluvium. Deposit present along west side of Mississippi River flood plain in Louisiana. Thickness 3–8 m; locally 10–40 m where deposit fills paleochannels that cut into underlying Pleistocene fluvial sand and gravel deposits

asj ALLUVIAL SAND AND SILT (Sand-silt facies of Prairie terrace as mapped by Saucier, 1974)—Light- to dark-brown, red, or reddish-brown, fine to coarse silty sand, locally interbedded with silt and gravel. Gravel is predominantly chert and quartzite, and is more abundant than in deposits of Prairie terrace farther south. Mapped areas include numerous abandoned channel and ox-bow lake deposits of silt, clay, and organic matter, and remnants of natural levee ridges underlain by oxidized sand and silt. Locally Prairie terrace is covered by a thin, discontinuous veneer of loess. Thickness of alluvial sand and silt 2–5 m; locally 10 m where it fills paleochannels that cut into underlying Pleistocene fluvial sand and gravel deposits

acc ALLUVIAL SILT AND CLAY (Silt-clay facies of Prairie terrace as mapped by Saucier, 1974)—Brown to red and dark-red clayey silt. Surface of deposit marked by numerous, closely spaced, circular depressions and small silty clay mounds. Depressions range from 3 to 150 m in diameter and are filled with light- to medium-gray silty clay grading downward to red-brown silt containing abundant dark-red iron-manganese "buckshot" pellets. Silt contains rare gravel lenses and grades down through fine sand into coarse sand interbedded with gravel lenses and clay lenses. Mapped only in Louisiana along margins of Mississippi River flood plain. Thickness 1.5–7 m; locally 50 m where it fills paleochannels cut into underlying Pleistocene fluvial sand and gravel deposits

da DELTA DEPOSIT (Prairie Formation of Fisk, 1938, 1940, in Louisiana and Mississippi)—Light-gray to brown, poorly to well-sorted sandy clay, silt, and clay, intermixed and interbedded. Locally includes scattered shell debris and thin, discontinuous lenses of peat. In places near coast, may include estuarine and lagoonal silt and clay and delta-front sand. Forms a delta plain that slopes seaward from about 18 m above sea level to 1.5 m above sea level. Mapped areas include younger swamp deposits and alluvial clay (**aca**). Thickness[1] 30–100 m

dsa DELTA SAND, SILT, AND GRAVEL (Distributary channel facies of the Beaumont Formation in Texas)—Yellowish- to brownish-gray, locally reddish-orange sand, silt, and minor fine gravel, intermixed and interbedded. Includes deposits of stream channels, point bars, crevasse splays, and natural levee ridges characterized by poorly defined meander belt ridges and pimple mounds aligned about normal to coast. Near coast, may include marine deposits. Thickness[1] 3–10 m on northern edge of outcrop; thickens southward to more than 100 m in subsurface

dla DELTA SILT AND CLAY (Interdistributary mud facies of Beaumont Formation in Texas)—Light- to dark-gray clay and silt intermixed and interbedded; contains layers and lenses of decayed organic matter. Comprises fluvial-delta plain, coastal-marsh, and lagoonal deposits. Includes plastic and compressible clay in depressions of former channels, inter-beach ridge swales, and coastal lagoons. Thickness[1] 5–10 m along north edge of outcrop; thickens southward to more than 100 m in subsurface

bma BEACH AND NEAR-SHORE MARINE SAND (Relict beach ridge and associated sand facies of Beaumont Formation in Texas)—Light- to dark-gray, light- to dark-brown well-sorted fine sand containing abundant shells and shell fragments and minor amounts of silt and clay. Interfingers with silt and clay in layers along inland margins. Includes beach, beach ridge, spit, and fore-island dune deposits. Surface commonly is thinly mantled by clayey silt and characterized by widespread pimple mounds. Locally it is mantled by sand dunes of Holocene age. Thickness 3–10 m

LATE PLEISTOCENE AND MIDDLE PLEISTOCENE

ela LOESS AND LOESSIAL COLLUVIUM AND ALLUVIUM—Yellowish-brown to reddish-brown and grayish-brown, massive silt mixed with clay and fine sand; locally includes thin lenses of very fine to fine quartz sand. Thickness ranges from a maximum of 30 m along the Mississippi River to 3 m at eastern limit of map unit. To east, loess, mixed with locally derived colluvium or alluvium, persists as a thin patchy deposit for 30 or more kilometers. Bluffs of thick loess along Mississippi River and other rivers are commonly deeply gullied. Locally, the loess comprises two units separated by a paleosol developed in the lower unit. Deposit mapped only in Mississippi. Thickness 1–30 m

LATE PLEISTOCENE TO EARLY PLEISTOCENE

asg ALLUVIAL CLAY, SILT, SAND, AND GRAVEL, UNDIFFERENTIATED (Alluvial terrace deposits of Deweyville, Beaumont, Lissie, and Willis age in Texas)—Light-brown to reddish-brown, mottled pinkish-orange, fine to coarse sand and silt. Includes lenses of yellowish-tan clay, and well-rounded to subangular gravel composed of quartz, quartzite, chert, silicified wood, and ironstone; clasts 1–4 cm in diameter. Cemented by iron oxide in places. Locally includes colluvium and sediments reworked from older terrace deposits. Thickness 3–20 m

csc COLLUVIAL AND ALLUVIAL GRAVEL, SAND, SILT, AND CLAY—Light-gray, yellowish-brown, or orange-brown, pebble to granule gravel, sand, and minor silt intermixed and interbedded. Gravel chiefly quartz, but also chert in minor amounts. Deposit mostly derived from Willis Formation (**agc**) on adjacent uplands. Includes some sand deposits of alluvial-fan origin, notably along southern edge of the uplands. Thickness 0.5–5 m

MIDDLE PLEISTOCENE

agd ALLUVIAL GRAVEL, SAND, AND SILT (Coarse-grained channel facies of Lissie Formation in Texas)—Light-gray, yellowish-brown, and tan, fine gravel, sand, and minor silt and clay, intermixed and interbedded. Clasts chiefly quartz and chert. Deposit locally cross-laminated, and characterized by scour-and-fill and slump structures common to channels in headward sector of delta plain. Surface generally slightly higher than adjacent terrain. Thickness 10–25 m

ash ALLUVIAL SAND, SILT, AND CLAY (Fine-grained channel facies of Lissie Formation in Texas; Bentley and Montgomery Formations of Fisk 1938, 1940, in Louisiana)—Light-gray to brown or

orange-brown, medium to fine sand, silt, and minor gravel and clay, intermixed and interbedded. Locally characterized by channel-and-fill and graded-bedding structures common to deposition in meander channels, point bars, and local braided channels on headward sector of delta plain. Surface generally characterized by pimple mounds and low dunes of Holocene age. Thickness 10–25 m, but more than 100 m in subsurface beneath younger seaward delta units

alf ALLUVIAL SILT AND CLAY (Fine-grained overbank facies of Lissie Formation in Texas)—Light-gray, tan, and yellowish-brown clay, silt, sand, and very minor pebble to granule gravel intermixed and interbedded, poorly to well sorted; locally contains calcium carbonate and iron oxide concretions. Commonly displays thin, laminar stratification and local crossbedding. In places, contains lenses rich in organic matter. Upper part stained by iron and manganese oxides. Flat surface characterized by abundant round shallow depressions and pimple mounds. Texture, structure, and distribution between alluvial channel deposits (**ash**) indicate flood overbank deposition in flood basins, backswamps, and lakes. Thickness 55–65 m

EARLY PLEISTOCENE TO PLIOCENE(?)

agc ALLUVIAL PEBBLE GRAVEL AND SAND (Citronelle or Williana Formation in Louisiana and Mississippi; channel facies of Willis Formation in Texas)—Light-gray to orange-brown or reddish-orange, gravelly coarse to fine sand containing lenses of moderate- to dark-red sandy silt and white to light-gray clay. Clasts, commonly in an unconsolidated coarse sand matrix, are subangular to subround granules to medium-size pebbles, mostly chert, but a few of quartz in Mississippi and Louisiana; in Texas mostly quartz but a few of chert. In Texas, deposits are characterized by structures indicating deposition in straight torrential channels, braided channels, and coarse meander belts on coalescing alluvial fans of moderate relief. In Louisiana and Mississippi, the Citronelle Formation is considered of middle Pliocene to possible early Pleistocene age on the basis of fossil leaves (Berry, 1916; Stringfield and LaMoreauz, 1957; Doering, 1958). In Alabama, a vertebrate fauna, collected from dark-gray clay beneath oxidized sand typical of the Citronelle Formation, has been assigned a Hemphillian (middle Pliocene) age by F.C. Whitmore (Isphording and Lamb, 1971). Mapped areas include some locally derived gravelly sand, alluvium, and colluvium. Thickness as much as 60 m; thickest at southern edge of outcrop

alc ALLUVIAL SAND, SILT, AND CLAY (Overbank facies of Willis Formation in Texas)—Light-brown, pale-yellow, orange, or orange-brown fine sand, sift, and clay intermixed and interbedded; a broad, dissected, gently sloping flood-plain and flood-overbank deposit; ferruginous nodules common in the oxidized upper part. Thickness 5 to more than 50 m along southern border of outcrop

QUATERNARY AND TERTIARY

zsa LIMONITIC SANDY DECOMPOSITION RESIDUUM[2]—Light-gray, yellowish-brown, brown, or dark-reddish-brown clay to silty clay, and fine to medium quartz sand; contains irregularly cemented to hard limonitic clay and limonite veins and nodules. Deposit grades down into sandstone, shale, and siltstone bedrock. Mapped areas include locally derived colluvium and bedrock outcrops. Thickness 1–15 m

zsb QUARTZ SAND DECOMPOSITION RESIDUUM[2]—Pale-gray to reddish-brown, locally muscovitic, coarse to medium quartz sand; locally slightly clayey. Locally contains irregular, hard, limonite-cemented masses, nodules, and veins. Mapped areas include younger locally derived colluvium, bedrock outcrops, and, in Texas, broad low sand dunes deflated from the residuum in late Pleistocene and Holocene time. Thickness 2–10 m

zse CLAYEY FINE TO MEDIUM SAND AND SANDY CLAY DECOMPOSITION RESIDUUM[2]—Gray, buff, orange, or brown, clayey, fine to medium quartz sand and fine sandy silty clay. In places, contains subrounded sandstone pebbles. Mapped areas include locally derived younger colluvium and bedrock outcrops. Thickness 1–3 m; thinnest where developed on tuff in Texas

zca SANDY CLAY DECOMPOSITION RESIDUUM[2]—Pale-yellow, orange, reddish-orange, or greenish-gray, mottled, fine sandy clay, locally clayey fine sand or clay; in places includes medium to coarse pebbly sand. Pebbles and sand chiefly quartz. Mapped areas include some locally derived colluvium and bedrock outcrops. Thickness 1–2 m

zcc FINE SILTY CLAY DECOMPOSITION RESIDUUM[2]—Black to dark-gray or dark-brown silty clay; light brown to reddish brown where oxidized. Clay is strongly smectitic; expands when wet, shrinks

and forms a crack structure, called gilgai, when dry. Mapped areas include some locally derived colluvium and bedrock outcrops. Thickness 0.5–1 m, locally as much as 2 m

zce MASSIVE CLAY DECOMPOSITION RESIDUUM[2]—Gray to dark-brownish-gray, yellowish-brown to dark-brown, or mottled light-red to orange clay, sandy clay, and fine quartz sand, commonly limonite stained. Clay is smectitic; expands when wet, shrinks when dry. Lower part of deposit may contain brown coal fragments. Mapped areas include some younger locally derived colluvium and bedrock outcrops. Thickness 1–3 m

zch SILTY OR MICACEOUS SANDY CLAY DECOMPOSITION RESIDUUM[2]—Brown silty clay and micaceous, fine sandy clay, commonly limonite cemented. Lower part may contain fragments of lignite and petrified wood. Mapped areas include some younger locally derived colluvium and bedrock outcrops. Thickness 1–2 m

[1]Thicknesses of delta deposits are approximate because (1) delta deposit thicknesses vary greatly from area to area; (2) thickness data from outcrops and drill holes are limited; and (3) it is difficult to ascertain the actual base of deposit. In practice, the base of a deposit is placed at a buried soil, a change in prevalent grain size or bulk density, or other characteristic indicating a significant change in depositional process. However, thickness of individual units may be overstated where similar delta deposits are superposed and their contact is not recognized.

[2]DECOMPOSITION RESIDUUM, for purposes of this map, is defined as material derived primarily by in-place chemical decay of clastic rock with no appreciable subsequent lateral transport.

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LOESS INDEX MAP

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