

BUREAU OF ECONOMIC GEOLOGY

Table 4. Summary of land and water resources of the Corpus Christi area, Texas.

UNIT	COMPOSITION OF SUBSTRATE	PHYSICAL PROPERTIES	TOPOGRAPHY, BATHYMETRY	GENERAL GEOLOGIC CHARACTER	GENERAL NATURAL BIOLOGIC CHARACTER	ACTIVE PROCESSES	HYDROLOGIC CHARACTERISTICS	NATURE OF DRAINAGE	ECONOMIC POTENTIAL	CURRENT LAND USE	WATER-BODY CHARACTERISTICS	LIMITING-USE FACTORS	NATURAL SUITABILITY	RECOMMENDED-USE CONSIDERATIONS
A1	Sand	Easy excavation, low shrink-swell potential, low plasticity and compressibility, high foundation strength (except where surface sand is very loose), poor slope stability, high corrosion potential	North of Aransas Bay—low ridges and swales, south of Aransas Bay—flat to slightly hummocky	Ancient barrier island and/or related shoreline environments; maximum thickness approximately 50 feet	North of Aransas Bay—swales commonly support fresh-water marsh vegetation; north of Corpus Christi Bay—prairie grass, mesquite, and live and dwarfed oak mottes and groves; south of Corpus Christi—bunch grasses, few scattered oak mottes and mesquite	Aquifer recharge, susceptible to wind and water erosion, flooding, and slope failure	High to very high permeability, high water table, shallow perched aquifer, variable water quality	Low moisture-retention capacity at surface, water commonly ponded in depressions	Potential sand resource, ground water	Rangeland-pastureland, wildlife ref-uge, urban-recreational development, recreation	—	High permeability, shallow water table, perched aquifer, loose sand, susceptibility to erosion and flooding, poor slope stability, high corrosion potential	Low-yield water-well development; light construction, grazing, recreation, wildlife conservation	Seal and/or monitor waste disposal sites and holding ponds; widely disperse and monitor septic systems; aquifer easily polluted; stabilize loose sand to increase foundation strength; and prevent roads from buckling; avoid devegetation; avoid deep excavations that may flood; protect buried pipes and cables
A2	Sand, locally mud and sandy mud	Easy excavation, low shrink-swell potential, low plasticity and compressibility, high foundation strength, poor slope stability, high corrosion potential	Flat to slightly rolling	Ancient deltaic deposits; medium- to coarse-grained sand, local mud and sandy mud lenses	Sparse to dense mesquite, scrub brush, scattered oaks, grass-covered where cleared	Aquifer recharge, susceptible to wind and water erosion, slope failure on steep-sided excavations	Moderate to high permeability, shallow aquifer, good water quality	Low to moderate moisture-retention capacity	Fill, ground water	Dominantly rangeland-pastureland	—	High permeability, shallow aquifer, loose sand, susceptibility to erosion, high corrosion potential	Water-well development, light and heavy construction, grazing, recreation	Seal and/or monitor waste disposal sites and holding ponds; widely disperse and monitor septic systems; aquifer easily polluted; avoid excessive devegetation; protect buried pipes and cables
A3	Sand and silt, local unmappped thin veneers of mud in Refugio and Aransas Counties	Easy excavation, low shrink-swell potential, low plasticity and compressibility, high foundation strength, poor to moderate slope stability, high corrosion potential	Flat, slightly rolling in Refugio County	Ancient delta distributary channels, delta margins, and river deposits; maximum thickness, 100 feet	Relatively open prairie grass with scattered oak mottes in Refugio and Aransas Counties; largely cultivated in San Patricio and Nueces Counties	Aquifer recharge, moderately susceptible to erosion particularly if devegetated	Moderate permeability, good water quality in Refugio County, poorer toward coast and to south	Generally low moisture-retention capacity in Refugio and Aransas Counties, moderate in Nueces and San Patricio Counties	Fill, ground water	Dominantly rangeland-pastureland in Refugio and Aransas Counties, dominantly cropland in Nueces and San Patricio Counties	—	Moderate permeability, shallow aquifer particularly in Refugio County, high corrosion potential	Light and heavy construction, grazing, cultivation	Seal and/or monitor waste disposal sites and holding ponds; widely disperse and monitor septic systems; foundation conditions may vary from place to place; avoid construction that crosses boundaries with adjacent land; protect buried pipes and cables
A4	Sand, mud veneer	Moderate to easy excavation, low to moderate shrink-swell potential, moderate to high plasticity and compressibility, moderate to high foundation strength, poor slope stability, high corrosion potential	Generally flat	Ancient floodplain deposits overlying river-channel deposits	Mostly cleared, prairie grass with scattered oak mottes; locally cultivated	Aquifer recharge, slope failure on steep-sided excavations	Moderate to high permeability; mud veneer partially retards infiltration of ground water	Low to moderate moisture-retention capacity	Fill	Dominantly rangeland-pastureland, locally cropland where mud veneer is relatively thick	—	Somewhat variable foundation conditions, moderate to high permeability, subject to some soil heaving where mud veneer is relatively thick, poor slope stability, high corrosion potential	Grazing, light and heavy construction	Seal and/or monitor waste disposal sites and holding ponds; widely disperse and monitor septic systems; consider mud veneer in foundation designs; avoid construction requiring steep slopes; protect buried pipes and cables
A5	Sand and silt, mud veneer	Moderate to easy excavation, low to moderate shrink-swell potential, moderate plasticity and compressibility, moderate to high foundation strength, poor to moderate slope stability, very high corrosion potential	Flat	Ancient delta and marine-reefed delta-margin deposits, mud veneer derived from adjacent areas or remnant of mud-rich deposits, variable thickness of veneer	Prairie and bunch grasses; locally cultivated	Some aquifer recharge, slope failure on steep-sided excavations	Moderate permeability, mud veneer—low permeability, shallow water table, poor water quality	Low to moderate moisture-retention capacity	Fill	Dominantly rangeland-pastureland, locally cropland where mud veneer is relatively thick	—	Somewhat variable foundation conditions, subject to some soil heaving where mud veneer is relatively thick, very high corrosion potential, commonly very shallow water table	Grazing, local cultivation	Seal and/or monitor waste disposal sites and holding ponds; widely disperse septic systems; consider mud veneer in foundation designs; protect buried pipes and cables
A6	Sandy mud, sand veneer	Moderate to easy excavation, moderate to high shrink-swell potential, low to moderate plasticity and compressibility, low to moderate foundation strength, good slope stability, very high corrosion potential	Flat	Interdistributary deposits of ancient deltas, sand veneer derived from erosion of adjacent sandy areas, variable thickness of veneer	Prairie grass with a few scattered oak mottes	Some recharge to subjacent aquifers; sand veneer susceptible to wind and water erosion, particularly if devegetated	Low to moderate permeability, sand veneer—moderate permeability	Generally low moisture-retention capacity, moderate locally	Fill	Dominantly rangeland-pastureland, locally cropland	—	Foundation characteristics somewhat variable, susceptibility to erosion, very high corrosion potential	In areas of low permeability—solid- and liquid-waste disposal and holding ponds; in areas of moderate permeability—septic systems	Physical properties somewhat variable—conduct onsite inspection and testing before undertaking heavy construction or selecting waste disposal sites or holding ponds; protect buried pipes and cables
A7	Mud, sand veneer	Moderate to difficult excavation, moderate to high shrink-swell potential, moderate to high plasticity and compressibility, low to moderate foundation strength, poor slope stability (especially when wet), very high corrosion potential	Flat	Interdistributary deposits of ancient deltas, thin sand and veneer derived from adjacent sandy areas	Prairie grass	Soil expands when wet, contracts when dry; sand veneer susceptible to wind and water erosion and slope failure, particularly if devegetated	Low permeability	Moderate to high moisture-retention capacity	—	Mixed rangeland-pastureland and cropland	—	Low permeability, soil heaving, low foundation strength, poor slope stability, short-term ponding of water, susceptibility to erosion, very high corrosion potential	Solid-waste disposal, holding ponds, grazing or cultivation	Conduct onsite inspection before using for waste disposal or holding ponds; avoid using sand veneer as cover material; widely disperse and monitor septic systems; engineer for poor foundation conditions; protect buried pipes and cables
A8	Mud	Moderate to difficult excavation, high shrink-swell potential, high plasticity and compressibility, low foundation strength, very high corrosion potential	Very flat except for localized clay-sand dunes along bay margins	Interdistributary deposits of ancient deltas including bay, floodbasin, and locally abandoned channel and lake deposits; also includes stabilized clay-sand dunes	Prairie grass	Soil expands when wet, contracts when dry, susceptible to slope failure	Low permeability	Moderate to high moisture-retention capacity, poorly drained	Potential source of clay for lightweight aggregate	Dominantly cropland	—	Low permeability, soil heaving, low foundation strength, poor slope stability, short-term ponding of water, cracks extensively when dry, very high corrosion potential	Solid- and liquid-waste disposal and holding ponds	Avoid clay-sand dunes; widely disperse and monitor septic systems; engineer for poor foundation conditions; protect buried pipes and cables
A9	Mixed mud and sand, rich in organics	Moderate to difficult excavation, moderate to high shrink-swell potential, high plasticity and compressibility, low to moderate foundation strength, very high corrosion potential	Topographic lows	Local channel fills of ancient rivers and deltas, higher sand content than in A10 due to sand-rich depositional environment; may include some adjacent permeable sand and silt (too numerous to be mapped separately)	Willows and fresh-water reeds and rushes, water-tolerant vegetation	Susceptible to flooding	Low to moderate permeability, susceptible to ponding of water	Moderate to high moisture-retention capacity, poorly drained	—	Dominantly rangeland-pastureland	—	Soil heaving, low foundation strength, susceptibility to flooding and ponding of water—poor drainage, very high corrosion potential	Construction of man-made ponds and stocktanks	Avoid use for waste disposal sites, holding ponds or septic systems; engineer for poor foundation conditions and poor drainage; protect buried pipes and cables
A10	Mud	Moderate to difficult excavation, moderate to high shrink-swell potential, very high plasticity and compressibility, low foundation strength, poor slope stability, very high corrosion potential	Topographic lows	Mud-filled abandoned channels, beach swales, tidal channels, and abandoned lakes	Prairie grass, locally seasonal hardwoods and other water-tolerant vegetation	Soil expands when wet, contracts when dry; susceptible to flooding and slope failure	Low permeability, susceptible to long-term ponding of water	High moisture-retention capacity, poorly drained	—	Dominantly cropland in southern part, locally rangeland-pastureland and wildlife refuge	—	Soil heaving, low foundation strength, susceptibility to ponding of water, poor drainage, very high corrosion potential	Construction of man-made ponds and stocktanks	Avoid use for waste disposal sites; holding ponds, or septic systems; engineer for poor foundation conditions and poor drainage; protect buried pipes and cables
A11	Sand, calichified	Moderate excavation, low shrink-swell potential, low plasticity and compressibility, high foundation strength, low corrosion potential	Moderately rugged topography; low scarps are common	Fan system	Prairie grass, scattered mesquite and scrub brush	Local recharge	Low to moderate permeability	Low to moderate moisture-retention capacity	Fill, caliche	Commonly rangeland, locally cropland	—	Low to moderate permeability, degree of calichification	Possible aggregate material, light and heavy construction	Conduct onsite inspection before using for waste disposal sites and holding ponds; engineer according to suitability
A12	Lakes, ponds, and sloughs	High to very high corrosion potential	—	Ancient and modern riverbed cutoffs and abandoned channels and heart-shaped lakes that are possibly wind-modified remnants of Pleistocene estuaries or delta margin lows; some man-made water features (flood ponds, reservoirs, and channels)	Waterfowl habitat, important to other types of animals	Ground-water recharge, stream flow, wave action	—	—	Surface-water supply	Surface-water supply, soil conservation, recreation, fish, and wildlife habitats	Permanent fresh-water bodies; coastal bodies—fresh to brackish or saline	Aqueous environment, high corrosion potential, important wildlife habitat, commonly interconnected with ground water or with bay, estuarine, and lagoon system	Water supply, recreation, soil conservation	Highly susceptible to pollution—avoid use for waste disposal or holding ponds
A13	Lakes, ponds, and sloughs (ephemeral)	Moderate to difficult excavation, high shrink-swell potential, high plasticity and compressibility, low foundation strength, high to very high corrosion potential	Depressed areas	Many were once permanent water bodies now filled with mud and silt, intermittently wet and dry	Commonly barren, may support fresh-water marsh plants during wet seasons	Frequent or seasonal flooding, susceptible to slope failure and wind erosion (when dry)	Low permeability	—	Water storage	Commonly rangeland, locally cropland	Fresh water, intermittently wet and dry	Soil heaving, flooding, low foundation strength, high corrosion potential	Water storage	Avoid use for waste disposal or holding ponds; protect buried pipes and cables
B1	Sand and gravel, local mud lenses	Easy excavation, low shrink-swell potential, high foundation strength, poor slope stability, high to very high corrosion potential	Stream valleys; upper reaches of active point bars slope toward stream; ridge-and-swale topography is common	Floodplains, point bars deposited along meandering streams, locally overbank muds	Barren if active point bar, water-tolerant hardwoods—pecan, hickory, live oak, water oak, blackjack oak, elm, hackberry, red bay, ash—carpetgrasses, Bermuda grass, bluestem, saccharista, greenbriar, mesquite, reams, yaupon, grape	Susceptible to erosion, stream siltation if devegetated, stream flooding, and slope failure	High permeability, shallow water table, connected to ground- and surface-water system	Low moisture-retention capacity at surface, dunes—well drained; flats—moderately to poorly drained; wind commonly ponded in depressions	Potential source of aggregate, network of ground water	Part of natural drainage network; rangeland-pastureland	—	High permeability, susceptibility to flooding and erosion and deposition	Water supply, recreation, wildlife conservation	Avoid use for waste disposal, holding ponds, or septic systems (surface and ground water easily polluted); avoid use for construction or elevate structures above floodplain; plan excavation of gravel to avoid altering stream flow; protect buried pipes and cables
B2	Mud and silt	Moderate to difficult excavation, high shrink-swell potential, low foundation strength, very high corrosion potential	Topographic lows adjacent to streams	Floodplains, overbank deposits	Water-tolerant hardwoods and grasses, fresh-water reeds and rushes	Highly susceptible to flooding and slope failure; mud deposited during floods	Low to moderate permeability	Ponded areas, slow drainage, high water table	—	Part of natural drainage network; dominantly rangeland-pastureland, locally good cropland	—	Low to moderate permeability, susceptibility to flooding, poor drainage, very high corrosion potential	Recreation, local cropland, grazing, wildlife conservation	Avoid use for solid-waste disposal, holding ponds, or septic systems; avoid construction or elevate structures above floodplain; protect buried pipes and cables
B3	Mixed mud, silt, and sand	Moderate excavation, variable shrink-swell potential, low to moderate foundation strength, very high corrosion potential	Elevated areas along streams	Floodplains, natural levees	Grasses, water-tolerant hardwoods and rushes	Susceptible to flooding	—	—	Flood protection	Local rangeland-pastureland	—	Variable physical properties, susceptibility to flooding, very high corrosion potential	Natural protection from floods, recreation, grazing, wildlife habitat	Avoid use for solid-waste disposal, holding ponds, septic systems and construction; maintain flood protection value; protect buried pipes and cables
B4	Alluvium sand, silt, and mud	Low foundation strength, poor slope stability	Gulries	Small active streams headwardly eroding into older Coastal Plain sediments	Locally tree-covered, hardwoods and grasses	Highly susceptible to flooding and erosion, particularly if bank devegetated	Commonly intermittent, flashy	—	—	Natural floodways and drainage network, drainage of farmland	—	—	Drainage network, construction of stocktanks, wildlife habitat	Avoid use for solid-waste disposal, holding ponds, septic systems, and construction; banks can be stabilized, but avoid filling gulries
C1	Loose sand and shell	Very high corrosion potential; incohesive	Sloping gently gulfward	Gulf beach deposit between sea level at low tide and the dune vegetation line	Crabs, clams, burrowing shrimp, and birds, barren of vegetation	Susceptible to flooding from storm tides, erosion by storms, and wind action; lower part inundated daily and affected by longshore drift	High permeability	Good drainage	Recreation	Recreation	—	Susceptibility to wind and water erosion and flooding, proximity to ocean, recreational value, very high corrosion potential	Sediment supply to dunes, recreation, wildlife habitat	Avoid construction that alters the dynamic equilibrium of the beach; avoid removal of sand from beach; structures should be designed to withstand flooding and high winds; keep beaches clean and pollution-free to enhance recreational value; protect pipes and cables
C2	Sand and shell	Easy excavation, generally high foundation strength, poor slope stability, very high corrosion potential	Continuous to discontinuous ridges, 5 to 40 feet high grading to flat or hummocky ramp sloping towards bay	Vegetation-stabilized fore-island dunes and barrier flats	Salt-tolerant plants, including grasses and vines, locally fresh-water plants	Aquifer recharge; highly susceptible to flooding and wind and water erosion, particularly if devegetated; deposition	High to very high permeability, high water table, shallow perched aquifer, wind commonly ponded in depressions	Low moisture-retention capacity at surface, dunes—well drained; flats—moderately to poorly drained; wind commonly ponded in depressions	Protection against storm surge, recreation, ground water	Rangeland-pastureland, residential development, recreation	—	High permeability, shallow water table, perched aquifer, loose sand, proximity to ocean, susceptibility to flooding and erosion, poor slope stability, subject to intense wind storms, very high corrosion potential	Low-yield water-well development, limited grazing, low-intensity recreation; dunes provide natural protection from storm tides	Avoid use for waste disposal or holding ponds; widely disperse and monitor septic systems (aquifer easily polluted); avoid prolonged devegetation—vegetative cover is essential to stabilize dunes and resist the effects of storm floods and winds; avoid high-density recreation on fore-island dunes; protect pipes and cables
C3	Sand	Very high corrosion potential; incohesive	Ridges and mounds, hummocky, locally steep relief	Active dunes and sand blowouts, originating where vegetation is stripped from fore-island dunes or the barrier flat because of fire, overgrazing, construction, drought, or storms	Barren to sparsely vegetated	Flooding and erosion by storm surge; wind erosion; active dunes tend to move NW because of prevailing southeasterly breezes; active fore-island dunes are more easily breached by storm surge than are vegetated fore-island dunes	High permeability	Good drainage	Potential source of fill for in situ development	—	—	High permeability, susceptibility to wind and water erosion and flooding, very high corrosion potential	—	Avoid use for construction site (without stabilizing sand), waste disposal, recreation, or other purposes; avoid use for recreational purposes that may damage or destroy near stabilizing vegetation; allow for vegetation use in planting programs to stabilize loose sand; protect pipes and cables
C4	Loose sand and shell	Very high corrosion potential; incohesive	Relatively narrow low areas (commonly abandoned tidal channels) and broader fan-shaped areas, generally flat, with local coppice mounds and wind-shadow dunes along gulfward edge, submerged along bayward edge	Storm washover areas, washover channels and fans where fore-island dunes are commonly poorly developed, or absent	Algal mats, locally marsh vegetation, sparse marine grasses in submerged areas	Extensive flooding by storm tides, erosion and deposition by storm waves and wind; sediment may be transported bayward of gulfward during different phases of a storm; channel openings on Gulf side are commonly closed by longshore drift; washovers commonly function as ducts for storm surge for many years	High permeability	Water ponded in channels scoured during storms	—	—	—	Extreme susceptibility to wind and water erosion and flooding, very high corrosion potential	Short-term recreation	Avoid use as construction site; construct roads built over washovers high enough and sufficiently well anchored to reduce chances of destruction or break during storms; avoid use for waste disposal or holding ponds; protect pipes and cables
C5	Mixed mud, sand, and shell	Very high corrosion potential; incohesive	Sloping gently bayward	Tidal flats	Algal mats, scattered clumps of salt-marsh grasses, fiddler crabs	Rapid frequent flooding by astronomical, wind-generated, and storm-driven tides; moderate wind erosion between tides	—	—	—	—	—	Susceptibility to flooding, very high corrosion potential	Short-term recreation	Avoid use for waste disposal, holding ponds, or construction site; dike spoil placed on tidal flats to prevent it from being eroded; protect pipes and cables
D1	Mud or sand	Very high corrosion potential; poor foundation conditions	Low-lying areas near sea level	Salt- to brackish-water marsh, recently developed on lower parts of estuarine deltas, backslides of barrier islands, along mainland shoreline, and adjacent to tidal creeks	Salt-tolerant grasses and succulents including cordgrass, glasswort, seepweed, sea oyster, and maritime saltwort; essential to estuarine food web, nurturing grounds for many commercially valuable fish and crustaceans, habitat for mammals and birds	Frequent flooding by saline water	Tidally connected with bay system	Poorly drained	Important food supply and nursery for commercially valuable fish and crustaceans	Wildlife habitat	Salinities range from near 0‰ after storm to somewhat hypersaline; daily temperature variations fluctuate up to 60°F	Flooding, importance to estuarine food web, wildlife habitat, poor foundation conditions, very high corrosion potential	Nursery and wildlife habitat, source of nutrients for bay, estuarine, and lagoon system, possible tertiary treatment of municipal sewage effluent, short-term recreation	Avoid destruction or permanent alteration; avoid use of herbicides and pesticides in adjacent areas; protect buried pipes and cables
D2	Generally mud	Very high corrosion potential, poor foundation conditions	Topographic lows	Fresh-water marsh, permanent and ephemeral, in lower courses of modern river valleys, particularly in abandoned stream courses, inland from salt marshes along bay margins, margins of coastal lakes, and swales on the interior portions of modern and ancient barrier shorelines	Succulent reed and cordgrass, cattails, and rushes, birds, reptiles, mammals, and crustaceans	Frequent flooding by fresh water	Permanent to commonly high water table (after rainfall), connected with surface- and ground-water systems	Poorly drained	—	Wildlife habitat, limited rangeland-pastureland	Fresh, permanent and ephemeral	Flooding, wildlife habitat, poor foundation conditions, very high corrosion potential	Breeding, nesting, and feeding grounds for wildlife, limited fishing and hunting, limited grazing	Avoid destruction or permanent alteration; avoid use of herbicides and pesticides in adjacent areas; protect buried pipes and cables
D3	Mud	Very high corrosion potential, poor foundation conditions	Topographic lows	Swamp—stream channel cutoffs in modern and ancient river valleys, generally inland from marshes	Dwarf palmetto, cypress, elm, bay, mulberry, water oak, gum, grapevine, and yaupon, raccoon, opossum, some mink and squirrels, fowl and snakes	Frequent flooding by fresh water	Permanent to commonly high water table	Poorly drained	—	Wildlife habitat	Fresh	Flooding, unique environment	Wildlife habitat, short-term recreation	Avoid destruction or permanent alteration; avoid use of herbicides and pesticides in adjacent areas; protect buried pipes and cables
E1	Mixed mud, silt, sand, and shell	Variable; very high corrosion potential	Mounds, locally steep relief	Man-made land and subaerial spoil, deposited from dredging operations	Variable, new deposits barren—locally deposited from dredging operations	Locally subject to extensive erosion and slope failure	Variable permeability, generally higher than parent material; new deposits may contain saline water	Variable, may modify natural drainage	New land for development	Variable urban, residential, and industrial development, wildlife habitat, recreation	—	Susceptibility to erosion and slope failure, variable physical properties, very high corrosion potential	Regulated disposal of additional spoil	Bulkhead and stabilize new deposits; conduct onsite investigation to determine physical properties; avoid construction of newly created land spoil that may be harmful to other natural environments; avoid use for waste disposal, holding ponds, or septic systems; protect buried pipes and cables
E2	Mixed mud, silt, sand, and shell	Variable; very high corrosion potential	Mounds, shoals	Subaqueous spoil deposited from dredging operations	Variable, locally marine grasses, snails, clams, and crustaceans	Wave and current erosion	May modify natural circulation	—	—	—	—	Susceptibility to erosion, high turbidity during dumping and maintenance, harmful to natural environments, very high corrosion potential	Regulated disposal of additional spoil	Allow spoil areas to equilibrate with other coastal environments; encourage growth of marine or marsh grasses; protect buried pipes and cables
E3	Defined by Federal statute, includes several land and water resource units	—	—	—	Wildlife refuge, variety of plants and animals	—	—	—	—	Wildlife preserve, recreation	—	—	Wildlife refuge	Consider the attributes and limitations of the natural resource units in management activities for the refuge
F1	Laminated mud and sandy mud	Soft, poorly consolidated, water saturated; very high corrosion potential	Less than 6 feet deep	River-inflowing bays, prodelta mud and sandy mud, modern bayhead environment near mouths of rivers	Low species diversity—clams, snails, crustaceans, foraminifers, and ostracods	Deposition of sediment transported by inflowing rivers; wave and current activity	Mixing of saline and fresh water	—	—	—	Generally low salinity—less than 10‰ salinity ranges from near 0‰ following heavy rainfall to near 35‰ when fresh-water inflows are minimal; high nutrient content, high in humic acid, high suspended-sediment content	Circulation and free exit of water necessary to maintain nutrient supply and to aid in flushing bays, very soft water-saturated mud bottom, very high corrosion potential	Recreation; sources of nutrients for remainder of bay, estuarine, and lagoon system	Maintain natural circulation; drive pilings into hard substrate or until surface friction will support weight of structure
F2	Mottled organic-rich mud with local concentrations of shell	Soft, moderately consolidated, water saturated; very high corrosion potential	Less than 8 feet deep	Enclosed or restricted bays, modern bay environment without tidal or riverine influence	Low species diversity—clams, snails, and oysters	Limited deposition of sediment transported by inflowing waters; wave activity	Restricted circulation	—	—	—	Variable salinity; high and low extremes are often reached; near bayheads with minimal saline-water influx water may remain brackish (less than 35‰)	Poor circulation, commonly deficient in dissolved oxygen, soft water-saturated mud bottom, very high corrosion potential	Recreation and commercial activity	Maintain natural circulation; conduct onsite investigation to determine physical properties or until surface friction will support weight of structure
F3	Mottled mud with local concentrations of shell	Soft, moderately consolidated, water saturated; very high corrosion potential	From 6 to 13 feet deep	Modern open-bay environment, moderate tidal and/or riverine influence	High species diversity—clams, snails, oysters, sponges, bryozoans, and crustaceans	Wave and current activity	Unrestricted circulation	—	—	—	Variable salinity, generally from 20‰ to 35‰, moderate to high dissolved-oxygen content	Circulation and free exit of water necessary to maintain nutrient supply and to aid in flushing bays, water-saturated mud bottom, very high corrosion potential	Recreation and commercial activity	Maintain natural circulation; drive pilings into hard substrate or until surface friction will support weight of structure; avoid using as spoil disposal site
F4	Mottled mud and sandy mud	Moderately consolidated to firm, water saturated; very high corrosion potential	From 6 to 13 feet deep	Modern bay environment, strong tidal influence	High species diversity—clams, snails, and foraminifers	Wave and relatively strong tidal current activity	Mixing of marine and bay water	—	—	—	Variable salinity, generally from 20‰ to 35‰, high dissolved-oxygen content	Circulation and free exit of water necessary to maintain nutrient supply, water-saturated mud bottom, very high corrosion potential	Recreation and commercial activity	Maintain natural circulation; drive pilings into hard substrate or until surface friction will support weight of structure; avoid using as spoil disposal site
F5	Sand and shell	Firm, locally shelly, very high corrosion potential	Shifting channels, 13 feet deep, less than 42 feet deep where dredged, less than 10 feet deep in ditas	Modern tidal inlets and subaqueous tidal-delta deposits	High species diversity—fish and shrimp, mollusks, echinoderms, sponges, corals, and bryozoans	Strong tidal currents, rapid sediment transport	Tidal circulation	—	—	—	Variable salinity, generally from 10‰ to 40‰, generally normal, depends on flow conditions	Circulation and free exit of water	Recreation and commercial activity	Maintain open, unobstructed tidal channels and natural circulation
F6	Sand, local mud and shell	Firm, locally shelly	Local shoals and bars, less than 6 feet deep	Modern bay-margin deposits; much of sand derived from erosion of bay margins, tidal deltas, and washover fans	High species diversity—clams, snails, crabs, and crustaceans; local sparse grass cover	Strong wave and current activity, rapid erosion, sediment transport and deposition	Well aerated by wave action	—	—	—	Variable salinity and temperature	Sensitive to disturbance; removal or addition of sediments disrupts dynamic equilibrium between sediment supply and existing energy levels	Helps dissipate waves and currents, thereby reducing dynamic erosion of adjacent subaerial sediments	Maintain dynamic equilibrium of bay-margin sand and muddy sand circulation and eliminates feeding grounds and erosion of bay margins
F7	Living and dead oysters, sand, mud, broken shell	Firm to hard	Locally high relief; tops of reefs less than 8 feet deep, interreef areas less than 12 feet deep	Reef, adjacent reef flank, and interreef areas, living and dead remnants of reefs	High species diversity—oysters, fish, clams, snails, corals, bryozoans, sponges, crustaceans, and echinoderms	Wave and current activity	Shell for construction and industrial use; live reef-oyster meat, dead reef-shell	—	—	—	Reefs aligned normal to circulation, salinities generally from 10‰ to 30‰	Live reefs—easily damaged or polluted	Recreation and commercial activity	Keep dredging operations to a minimum near live reefs to maintain low turbidity; avoid destruction of reefs that alters bay circulation and eliminates feeding grounds; avoid construction on or near live reefs
F8	Sand and muddy sand	—	Shallow areas less than 6 feet deep	Bay bottom supporting marine grasses	Sparse to dense growths of marine grasses; high species diversity—algae, echinoderms, clams, fish, and crustaceans; important biological resource	Protected from strong currents and wave activity by spits and storm berms; grasses baffie current movement and help prevent erosion	—	—	—	Wildlife preserve, breeding grounds	Variable salinity and temperature, salinities generally from 20‰ to 35‰	Sensitive environment, easily disturbed, provides shelter and food for numerous game and commercially valuable fish	Recreation and commercial activity	Avoid dredging, channelizing, spoil disposal, construction, and other activities that disturb the natural ecology and increase turbidity
F9	Sand and shell	Firm, shifting sand bars	Sloping gulfward approximately 30 feet per mile, local berms and bars; depths—mean low tide to approximately 8 feet deep	Upper shoreface, includes surf zone	Clams, snails, echinoderms, and crustaceans	Strong wave current activity, sediment transport, deposition, and erosion	—	—	—	—	Normal salinity 35‰, except briefly during severe rainfalls	Susceptibility to high winds, wave, and current activity, dynamic equilibrium between erosion and deposition, recreational value	Recreation	Avoid construction of large structures—avoid disturbance of equilibrium
F10	Muddy fine sand, grading seaward into mud	Firm to moderately firm	Slightly inclined gulfward; depths greater than 8 feet; gradient change from approximately 20 feet per mile to less than 10 feet per mile	Lower shoreface and open Gulf shelf	High species diversity—mud shrimp, clams, snails, fish, echinoderms, and crustaceans	Wave and current activity during storms	—	—	—	—	Normal salinity	Susceptibility to high wind, wave, and current activity during major storms	Recreation and commercial activity	Long pilings needed—design structures to withstand strong currents and wave activity
F11	Thin deposits of loose sand and shell	Similar to beaches (C-1), but with generally more shell	Subaerially exposed ridges and swales	Beaches and berms deposited by storm waves and currents along and near bay margins and along the southern margins of heart-shaped lakes on Coastal Plain	Local salt- and brackish-water-tolerant plants, locally barren	Susceptible to storm flooding and erosion; includes active and abandoned deposits	High permeability	—	—	Recreation	—	High susceptibility to erosion, modification, and flooding during storms	Recreation, helps dissipate wave and current energy during storms	Avoid activities that affect sediment movement and impinge on marsh environments