Human-Environment Relationships along the Mississippi Coast

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Introduction

The interaction of humans and the environment has been an important aspect of geography since the days of the Greeks. The modern importance of this human-environment (also known as “land-human”, and formerly as “man-land”) relationship is seen by its status as one of the “four traditions of geography” (Pattison, 1964) as well as one of the “five fundamental themes in geography” (AAG/NCGE, 1984). Our perceptions of the environment have changed dramatically since the time of the Greek civilization: we used to think that the environment determined how humans could adjust to it and live in it, but now we realize that humans not only can dominate and “tame” the environment but also significantly modify and even destroy it. Americans rediscovered Earth Day in 1990, the United Nations sponsored Earth Summit in June 1992, and ecotourism seems to be replacing mass tourism. Such ongoing changes in human-environment relationships will undoubtedly keep this theme at the core, if not the vanguard, of the discipline of geography.

One environment in which human attitudes toward nature have changed considerably over the years is the dynamic coastal environment, and in no place are such changes better illustrated than along the mainland coast of Mississippi. The Indians and early European settlers avoided settling along the shoreline because they recognized the potential impact of natural processes of erosion and periodic devastating storms. This respectful attitude toward nature gradually disappeared as tourists and developers transformed the coast into a beachfront-oriented recreational landscape (Meyer-Arendt, 1991). By the mid-20th century, the Mississippi coast had become structurally reshaped, and little of the natural environment remained. Seawalls, artificial beaches, groins, bulkheads, and land reclaimed from the nearshore by filling with oyster shells have largely replaced Mississippi’s natural beaches (Figure 1). This process of shoreline engineering has been described by some as “New Jerseyization” in dubious honor of the state that has experienced the most human-induced adverse beachfront modification (Canis et al., 1985). In spite of devastating killer hurricanes such as Camille (1969), which remind us of the vulnerability of the coastal environment, a highly engineered shorefront is maintained in Mississippi.

This article describes the sequence of human settlement along and resultant geomorphic alteration of the mainland beaches of Mississippi. It illustrates the changing human-environment relationships that have created the modern coastal landscape.
Physical Setting

Until early this century, Mississippi’s three coastal counties largely were fronted by narrow beaches. These beaches were naturally maintained by waves (especially storm waves) eroding Pleistocene beach ridges or other Pleistocene uplands, which contained much sand (Meyer-Arendt & Gazzier, 1990). Geologically, Harrison County consists of an extensive Pleistocene beach ridge complex (multiple Ice Age sand dunes), and a popular narrow beach was maintained at its seaward base (Otvos, 1985). Similarly, narrow eroding beaches occupied the bases of the Pleistocene uplands of Hancock and Jackson counties. In coastal reaches without adjacent uplands where low wave energy conditions prevailed, shorelines were (and are) either muddy or marshy—such as near the mouth of the Pearl River.

Respect for Nature, 1699-1811

Although Indians were known to have enjoyed the resources—especially shellfish—of the Mississippi Coast, the French in 1699 were the first to select the area for permanent settlement. The mainland coast was perceived to be protected from devastating hurricanes by the barrier islands, where a suitable ship anchorage was quickly found (in the lee of Ship Island). Although the initial settlement (Old Biloxi) was sited in present-day Ocean Springs, it was moved to the north (lee) side of the Biloxi peninsula in 1720, and plans called for construction of a beachfront fort (Prior, 1947; Sullivan et al., 1985). No fort was ever constructed, however, as the importance of this French outpost quickly waned. Throughout the 18th century, the few mostly French-descended coastal inhabitants engaged in fishing, farming, stock-raising, exploiting pine resources, and trading with the urban center of New Orleans (Alexander, 1980; Scholtes & Scholtes, 1985; Sullivan et al., 1985). Periodic incursion by marauding Indians pushed the settlers offshore to the barrier islands (especially Cat Island and Deer Island), and periodic hurricanes drove the surviving settlers back to the mainland. Throughout the pre-American period, human impacts along the shorefront remained relatively insignificant.

A Shift toward the Seashore, 1811-1861

The economic patterns established during the colonial period—farming, stock-raising, lumbering, fishing, and trading—continued into the 19th century, but a new form of economic activity—
recreation and tourism—was rapidly gaining importance. Even before admission into the United States in 1811, the well-to-do of New Orleans made their way to the beaches of present-day Hancock County, and, following statehood in 1817, this pattern of summer sojourns at the coast increased in popularity (Claiborne, 1876; Hayden, 1950). The advent of the steam engine in the late 1820s soon led to the introduction of steamboat service between New Orleans and Mobile, and the 1840s and 1850s were characterized by more visitors and more hotels and summer homes. Residents of nearby New Orleans fled summertime yellow fever outbreaks and Mississippi plantation owners and their families escaped the oppressive summer heat (Hayden, 1950; Smedes, 1965). Biloxi, historically the most important commercial center on the coast, became popular for tourists from both New Orleans and Mobile, and several hotels were built (including the Magnolia Hotel—now renovated as the Mardi Gras Museum). The Biloxi waterfront was modified to accommodate numerous wharves where steamships and sailing vessels docked. At nearby Old Biloxi, natural springs prized for their alleged hydrotherapeutic qualities stimulated a hotel-building and resort development phase, and the town name was changed to Ocean Springs (Schmidt, 1972). A few miles west of Biloxi, a new city was platted, and the grandly named Mississippi City became the seat of the newly created Harrison County. Unfortunately for the town boosters, plans to become the southern terminus of a rail line from Jackson and to house the state’s first major university were never realized (Sullivan et al., 1985). Pass Christian, however, being closer to New Orleans, became a resort “equal to White Sulphur Springs, Saratoga, and Newport” replete with many grand hotels and the oldest yacht club in the South (Hayden, 1950). Because of the narrowness of the sand beach, however, the major factor that led to its tourist development was the annual summertime evacuation of disease-prone New Orleans (Hayden, 1950). Similarly, the muddy, shell-strewn tidal flats of Pascagoula attracted wealthy summer residents from Mobile (Higginbotham, 1967; Wixon, 1982).

With increasing coastal urbanization in the late antebellum period, the extent of human impact upon the shore zone began to increase. Newly built nearshore structures included wharves and private piers, the latter often containing pavilions for fishing and bathing. Because the Mississippi shorefront was dissected by bayous and marshy lowlands, the preferred development sites were the Pleistocene beach ridges covered with live oaks (Quercus virginiana). Typically, a low scarp delineated the seaward edge of a beach ridge, at the base of which a gently graded, vegetated backshore and narrow sand beach extended to Mississippi Sound. Except for in the urban centers of Pass Christian and Biloxi, few residential or commercial structures were built below the scarp. The beach was occasionally used for short-distance horse or carriage travel, but no true beach road was built during this period. The main east-west connection remained the Pass Christian-Port Cadet Road (Pass Road) along the spine of a dune ridge.

Development of the Beachfront, 1865-1905

The incipient tourism boom was interrupted by the Civil War, and although much of the South entered a turbulent period of Reconstruction, the Mississippi Gulf Coast benefited from a period of affluence that climaxed in the late century Gilded Age (Sullivan et al., 1985). Hotels re-opened after the war, and steam packets from New Orleans again deposited tourists at beachfront wharves. The opening of the Louisville & Nashville rail line between New Orleans and Mobile in 1870 stimulated a new boom not only by facilitating ease of access but also by expanding the tourist hinterland to the rest of the nation. For a brief period, Northern thermalists turned the Mississippi coast into a winter recreation destination, but this changed as railroads soon expanded southward into Florida and into southern California (Hayden, 1950). Summer tourism again became dominant along the Mississippi coast, and more beach hotels, ranging from modest to grand, were built in response to seasonal touristic demand, especially at Biloxi and Pass Christian.
All of these events led to a larger coastal population and an increasingly complex coastal infrastructure in the 1870s. Although the primary east-west transportation linkages in Harrison County—Pass Road and the new railroad—remained atop the higher dune ridges, the beach became more popular for strolling and riding in buggies, even though the latter frequently became mired in wet sand (Lang, 1936). At the same time, Biloxi was becoming the center of a new seafood industry, based on the canning of shrimp and oysters, which produced a valuable byproduct. Oyster shells, first put to use in land reclamation along the Biloxi waterfront, were found to be suitable roadbed material (especially when crushed). The use of oyster shells as paving material along the soft beach led to the naming of the incipient beachfront road Shell Road (Black, 1986). In places the Shell Road followed the backshore of the beach, and in other places it followed a course amidst the live oaks above the scarp. In spite of a serious 1893 hurricane which caused significant damage, the segments of the Shell Road gradually became extended. By 1900, telegraph poles and boardwalks began to be built alongside the Shell Road, which continued to be lengthened. Although a 1901 hurricane caused further damage to the beachfront, plans to build a beach trolley were interrupted only temporarily (Sullivan, 1985) (Figure 2).

A direct link with the interior of Mississippi finally came with the southward expansion of a rail line from Hattiesburg in the late 1880s (Black, 1986). The 1893 hurricane had drawn attention to the need for a safer harbor, and by the mid-1890s a new port—incorporated as Gulfport in 1898—was built (Alexander, 1980). An artificial harbor was created by fill dredged from a channel to Ship Island, and the historic Ship Island anchorage was rendered obsolete. As if to epitomize the opulence of the Gilded Age, the grandest beach hotel along the Mississippi coast, the Great Southern Hotel, was built in 1903, the same year that the Gulfport Yacht Club and bathing pavilion opened (Black, 1986; Cox & Martin, 1905). Electricity came to the coast, the beach trolley between Gulfport and Biloxi was completed, and tourism was at an all-time high.

The Fight against Shoreline Erosion, 1905-1951

By the early 1900s, attitudes toward the dynamic coastal environment began to change. Periodic hurricanes became regarded as evils that could be fought and not retreated from as in the past. When a 1909 hurricane caused serious damage to the shell highway and the new interurban trolley, petitioning for state involvement in erosion control began. A more severe hurricane in 1915 destroyed half of the beach roadway which by
then was nearly continuous along Harrison County (Figure 3), and in 1916 the Mississippi legislature passed a law committing the state to protect the sand-and-shell “highway” (anonymous, 1930). Partly to ensure that the state commitment would be honored, the coastal communities quickly linked and improved the Shell Road. In 1918 it was rechristened the Old Spanish Trail as part of a national tourism promotion effort. Rights-of-way were obtained, low areas were filled, and the road was graded and partially paved—a vast improvement over the oyster shells, according to Model T drivers (Bergeron, 1991). This construction resulted in widespread alteration of the entire Harrison County shorefront, as many bayous became impounded and wetlands destroyed.

The 1915 storm also directly stimulated seawall construction along the Mississippi coast. The greatest feat of all was the construction of the 26-mi (43-km) seawall fronting Harrison County, allegedly the second longest seawall in the world (Davis, 1988; MDWC, 1986). Funded by a state tax on gasoline, the stepped-concrete seawall of Dutch design was built between 1924 and 1928. Coinciding with the great land boom of the 1920s, the seawall imparted a false sense of security to prospective homeowners and contributed to extensive building of summer homes and hotels (Figure 4). The seawall did protect the highway and coastal property under normal wave conditions, but the fronting natural beach soon disappeared because of scouring by waves,
especially west of the Biloxi lighthouse. Hancock County, which began to build a seawall on a piecemeal basis in 1915, modeled its 11.5-mi (19-km) long stepped seawall (and adjoining Beach Boulevard) after that of Harrison County. Following its completion in 1928, several groins (structures built extending into the nearshore to trap longshore-migrating sands) were built to protect a nourished sand beach, but this proved ineffective (SBPT, 1986). Pascagoula and Ocean Springs also built concrete seawalls in the late 1920s (Higginbotham, 1967; Kinser, 1982), which in places replaced older wooden seawalls (Meyer-Arendt et al., 1992).

Although the Depression slowed the rate of growth on the Mississippi Coast, beach-oriented tourism kept the economy afloat (Prior, 1947). Biloxi’s Buena Vista Hotel on Central Beach was the grandest of the coast hotels during the 1930s (Figure 5), and its popularity stemmed in part from its ability to retain a natural sand beach. Along Biloxi’s other beaches, the sands gradually disappeared from in front of the seawall. One of few hotels built in this period was the Broadwater Beach Hotel, which created its own sand beach by constructing two groins and pumping sand between them. Bay St. Louis also (again) experimented with beach nourishment in the early 1940s, but again the sands washed away (SBPT, 1986).

Coastal Mississippi was entering a post-World War II economic rejuvenation when a severe hurricane struck in 1947. The first major storm since 1915, it destroyed much of the Biloxi waterfront, but surprisingly the artificial beach at the Broadwater Beach Hotel sustained only minor erosional damage (Sullivan, 1985). Many stretches of seawall were greatly damaged, however, and Harrison County requested that the U.S. Army Corps of Engineers assess the damage. The Corps recommended that artificial nourishment be used to protect the seawall and highway (Wilson, 1951). By 1951, 700 acres (285 hectares) of beach was created, 300 ft (90 m) wide and 26 mi (43 km) long (Escoffier & Dohle, 1954). This “longest manmade beach in the world”, although built as a storm buffer, also served as a recreational resource and attracted increasing numbers of tourists to Harrison County (anonymous, 1951). Meanwhile, in spite of severe damage from the 1947 storm, no beach nourishment efforts were made in Hancock County.

Figure 5
Buena Vista Hotel, Biloxi, 1939.
(courtesy Ms. Murella Hebert Powell, Biloxi Public Library)
Maintaining an Artificial Beachfront, 1951-present

The effectiveness of Harrison County's artificial beach in protecting the seawall became apparent in the 1950s and 1960s as the Mississippi coast was struck by several hurricanes. Although minor storms (Flossy in 1956 and Ethel in 1960) and a major storm (Betsy in 1965) removed much of the beach sand, the seawall was little damaged (Sullivan, 1985). Hurricane Betsy caused much damage to the unprotected seawall in Hancock County, however, and after the storm a 6-mi (10-km) long and 150-ft (45-m) wide artificial beach fronting a repaired seawall was completed (Dixon & Pilkey, 1991; SBPT, 1986). Hurricane Camille, one of the most powerful hurricanes ever to strike the U.S. mainland, struck the Mississippi coast in 1969 and caused extensive destruction and heavy loss of life. The sand beaches were greatly eroded, but the seawalls withstood the storm relatively well (Sullivan, 1985; USACE, 1970). To restore the human-modified coastal landscape, a major beach renourishment project in Harrison County was completed in the early 1970s (Brown & Russell, Inc., 1972; Dixon & Pilkey, 1991). Subsequent hurricanes continued to erode the artificial beaches, and Hancock County lost most of its sand in the aftermath of Hurricane Elena in 1985. In 1992 the county began dredging sands from offshore of Henderson Point to restore its beaches to their former glory. Harrison County is presently experimenting with sand fencing, feeder dunes, and planting of beachgrass and sea oats in efforts to preserve its beach sand from being removed by winds and waves (MDWC, 1986).

The shorefronts of Pascagoula and Ocean Springs are also armored with seawalls, and, where fronting beaches have been created from dredged sediments, erosion continues to be a problem. At Pascagoula only a 3000-ft (900-m) long artificial beach—Pascagoula Beach—fronts the 2.3-mi (3.8-km) long seawall, but two 1.1-mi (1.8-km) long sections of seawall-protected shoreline at Ocean Springs have had sand beaches (Front Beach and East Beach) in place since the early 1950s (Meyer-Arendt et al., 1992). As at Bay St. Louis, however, tidal currents continually erode the sand from Front Beach, and occasional renourishment has been necessary. At the more sheltered East Beach, however, wetlands have naturally colonized the seaward margins of the artificial beach.

The newest reach of Mississippi shoreline to become modified is Bellefontaine Beach, where many vacation homes and permanent residences have been built along an eroding shoreline over the past several decades (Meyer-Arendt, 1992). In response to erosion of beaches and property, local landowners have built a total of 25 groins and 35 bulkheads (low wraparound “seawalls” constructed to protect private property). Due to the relative ineffectiveness of these structures in maintaining a beach or in protecting property from collapsing into the sea, local homeowners recently have requested state assistance. In 1992, the Mississippi Bureau of Marine Resources and the Office of Geology of the Mississippi Department of Environmental Quality initiated a comprehensive study of the Bellefontaine region. No matter what the outcome of the study may be, it is likely that human modification of the Bellefontaine shoreline will continue.

Summary:

Changes in Attitudes, Changes in Landscapes

The mainland shoreline of Mississippi has been greatly modified since the first settlers arrived, especially since the onset of tourism in the 19th century. The greatest shorefront impacts have taken place at Biloxi and Gulfport where reclamation of the intertidal/nearshore zone has been extensive (Figure 6). Between urban nodes, beachfront development has resulted largely from hotel and summer home construction and tourist-oriented commercial development. Such development early in the century stimulated the evolution of a beach highway which, in turn, prompted construction of the seawall as natural processes of erosion continued. The beach and the sea air were the prime tourist attractions, and after beaches were scoured away by waves (especially during storms), artificially nourished beaches were introduced. Typhified by Harrison County’s “longest manmade beach in the world”, this seawall/artificial beach

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landscape diffused to Hancock and Jackson counties as well. Only the more recently developed Bellefontaine Beach area retains some semblance of natural conditions, but this is rapidly disappearing as the shoreline becomes increasingly engineered.

The present coastal landscape of the Mississippi mainland is the result of many years of human adjustment to and modification of a dynamic shoreline. Ever since the coastal environment became a popular site for settlement, human attitudes toward processes such as shoreline erosion have evolved, from a respect for to domination of. Partly this may be attributed both to state and federal legislative policies which reflected and reinforced such changes in attitudes (Meyer-Arendt, 1992, in press) and also to modern technology made possible widespread engineering modifications to the coastal environment. In Mississippi, unlike in many coastal states, such human alteration of the beachfront actually has slowed natural shoreline retreat rates. However, such a landscape requires maintenance such as post-storm reconstruction and periodic renourishment of beaches. Not only has a natural landscape been replaced by a human-created landscape, but also natural processes of beach maintenance have been replaced by human processes of beach maintenance.

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References


