Tourism Development on the North Yucatan Coast: Human Response to Shoreline Erosion and Hurricanes

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ABSTRACT: The barrier coast of north Yucatan has been evolving into a beachfront recreational landscape since the introduction of passenger rail service between Mérida and Progreso in 1881. Beginning in the 1950s, middle-class vacation home construction spread laterally outward from Progreso, and even distal fishing and salt-gathering villages became engulfed by a recreational landuse overlay. In spite of geomorphic evidence of marine transgression, such as dune scarps and washover fans, the focus of recreational urbanization has been the beachfront. And although attempts at retarding shore erosion have taken place since the 1960s, hazard perception has remained generally low until the late 1980s. When Hurricane Gilbert blew across the Yucatan peninsula in 1988, damage to beachfront structures, highways, boats, and salt ponds was extensive. The barrier environment exhibited extensive overwashing and breaching, especially in areas of human modification, and the lagoon ecosystem experienced considerable ecologic disruption. Because the north Yucatan coast is a locus of domestic tourism, and the thousands of uninsured summer homes are owned largely by members of Mérida’s middle class, reconstruction since Gilbert has been slow. Incipient trends of international tourism development have slowed since 1988.

Introduction

Although not lying directly in the paths of most hurricanes that strike the peninsula, the N coast of Yucatan is nonetheless vulnerable to various physical and socio-economic impacts resulting from storm activity. Its geographic orientation makes the N coast vulnerable to waves and storm activity generated by polar outbreaks (nortes) in addition to periodic hurricanes. Perhaps partly because of the adverse physical environment, the N coast remained sparsely urbanized throughout the Mayan and Spanish colonial historical periods.

When the late 19th century henequen (sisal) boom stimulated construction of a railroad and a port (Progreso) at the closest coastal access to the Yucatecan capital of Mérida, a new phase of beachfront urbanization began. Although much of this urbanization was directly related to port development, an increasingly larger share was related to tourism and summer home (casa veraniega) development. This latter form of urbanization depended in large part upon levels of disposable income by the citizens of Mérida (Meridanos), and successive economic booms (including the henequen boom of the Gilded Age, the post-Revolution Roaring 1920s, and the postwar 1950s and 1960s) were accompanied by corollary increases in rates of beachfront urbanization. Additional factors of proximity (35 km) and size of Mérida (about 600,000 in 1990) have helped to create one of the few resort clusters along Mexico’s Gulf of Mexico shoreline (Meyer-Arendt 1987a; 1987b). Centered on Progreso, contiguous beachfront housing extends over 20 km in length from Chuburná Puerto to east of Chichxulub Puerto (Fig 1). The ‘recreational frontier’ continues to expand eastward, and smaller fishing and salt-gathering towns – from Telchac Puerto to Dzilam de Bravo – have increasingly become subjected to touristic encroachment. Unlike Yucatan’s Caribbean coast, which is better endowed with physical characteristics popular with international tourists (eg. clearer water whiter and sandier beaches, coral reefs, and...
steady trade winds), the N coast has remained a locus of domestic tourism – popular especially with Meridanos as a weekend or vacation retreat (Meyer-Arendt 1990).

Awareness of hurricane and storm damage along the N Yucatan coast has historically been higher among local residents than among summer home owners. Oral accounts of past storms and lagoonal flooding abound, and physical evidence of shoreline erosion and coconut palm blow-downs is easily seen. Even the beachfront summer home owners have become aware of physical hazards since the intensive construction began in the 1960s, and shoreline retreat has been futilely combatted by haphazard groin (espolón) and seawall construction.

When Hurricane Gilbert passed, in the early evening of September 14th, 1988 (local time), the impact came perhaps as a surprise but not as a total shock.

It is the aim of this paper to present a brief background of human occupation of the fragile coastal environment of north Yucatan, in particular the impact of tourism development. Both the physical and cultural landscapes of the N Yucatan coast are distinct from those of the E coast of Yucatan, and this may explain differences in both the impacts of and recovery rates from Hurricane Gilbert.

Coastal Geologic Setting

Characterized by multiple beach ridges, which reflects Holocene accretionary shoreline regression over the submerged limestone platform, the North Yucatan coastal barrier is locally fronted by vegetatively stabilized dunes up to 3 meters (m) high, such as at Chuburná. Dune height and the width of the beach ridge plain varies along the N coast. In the vicinity of Progreso, as many as 12 sand ridges comprise a beach ridge plain nearly one km in width. The coast from San Crisanto to near Dzilam de bravo contains only one to three ridges, and the narrow barrier is subject to periodic breaching and overwash activity. Approaching Dzilam de Bravo, wave energy decreases and the sand beach turns to a finer-grained mud. Nearshore beach ridge development is occasionally seen by emergent vegetated bars, and interbar deep muck extends a least 100 m seaward (Edwards 1954). The beaches are composed of carbonate materials on a wave-cut surface developed on the limestone platform (Tanner 1975). The shoreline is generally long and straight, except where interrupted by small Pleistocene limestone outliers (Sapper 1945). Some of these outliers lie in the nearshore, where they function as natural breakwaters and reduce wave energy. Some even have produced tombolos. The 200-km long barrier is separated from the limestone mainland by an extensive mangrove-fringed lagoon, referred to as La Ciénaga (Estero Yucalpetén in the vicinity of Progreso). This shallow lagoon system, which extends across most of the NW Yucatan peninsula, is noted for its variety of waterfowl, fish, and salt-gathering potential (Edwards 1954; Wilson 1980).

The N Yucatan coast has experienced varying rates of annual shoreline erosion. Retreat rates of 1.8 m/yr over a 110-year period have been reported (Gutierrez 1983), but rates of between 30 and 60 cm/yr were found in the Progreso area for the 1948–1978 period (Meyer-Arendt 1987b). East of Progreso, shore erosion has been reported to exhibit a high degree of cliffing of beach ridges (Tanner 1975). Ocean currents enter the Gulf of Mexico through the Yucatan Channel (between Yucatan and Cuba), and current divergence sets up an east-to-west longshore current – and a corollary east-to-west longshore sediment transport – along the N coast. Although longshore sediment transport rates have not been calculated, estimates easily could be made on the basis of net sediment accretion updrift of jettied harbor entrances (Gutierrez-Estrada et al. 1988). By the same token, most shoreline erosion has occurred downdrift of the jettied harbor entrance at Yucalpetén, where rates of 90 cm/yr were calculated for the 1948–1978 period (Meyer-Arendt 1987b).

Settlement History

In the pre-colonial era the region was part of the Yucatec Maya province of Chehpech. Salt production and fishing were the primary aboriginal economic activities, and several early habitation sites dotted the N coast, including a village at Chuburná Puerto and several small shell middens along the lagoon (Eaton 1978).

During the colonial era, fishing and salt production remained important in the many small hamlets of the Gulf of Mexico coast of Yucatan. Salt production was the major economic activity at several locales, including Chuburná Puerto, Chicxulub Puerto, Telchac Puerto, San Crisanto, Chabihau, and Santa Clara, and also the pre-