

Chapter 7

Floodplain Infrastructure and the Toxic Tide

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ABSTRACT

The human species is drawn to water. They are attracted by its dynamic flow and the promise of renewal that can lift their spirits up from the mundane. However, there is a growing awareness of how prior and current building practices continue to jeopardize environmentally sensitive wetlands, estuaries, bays, rivers, and coastal sand barriers. Constructing infrastructure in the floodplain causes erosion, pollution, habitat loss, invasive species, and increased vulnerability to hurricanes and other flooding disasters. This chapter will focus primarily on how building infrastructure located in the flood plain can affect the environment under the duress of catastrophic storm events. Reference is made to more far reaching phenomena global issues such as climate change, sea level rise, shifting continental fault lines, and other meteorological and geological changes that appear to be hastening the appearance of major disastrous events.

INTRODUCTION

With a surging population and a relentless desire for progress to manufacture comfort and convenience at a profit, the enterprising human species has jeopardized the health and wellbeing of present and future generations. Through deforesting for timber harvesting, land clearing for agriculture, mining and excavation for construction materials and energy production, and chemical manufacturing to expedite production, the contamination of natural resources continues despite attempts at government regulation and a concerned public. Comprehension of this tenacious relationship between infrastructure and the natural environment is therefore most vital for effective contemporary healthcare practice.

Construction and operation of environmentally insensitive infrastructure in riverine, coastal, and offshore locations is not only jeopardizing sensitive wetlands, bays, rivers, dunes, and coastal sand barriers, but is also increasing vulnerability to hurricanes and other flood related disasters. The emergence of the industrial revolution and its exploitation of natural resources, malfunctioning facilities, and toxic

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waste dumping has brought uncontrolled water pollution to an unprecedented danger point. Dredging deeper harbors and channels for uninterrupted seaway trade between ocean, lakes, and rivers has allowed foreign species to invade native habitats with devastating consequences. Only by carefully analyzing how infrastructural evolution since the industrial revolution has affected the natural environment can real progress be determined. This chapter will explore how hurricanes and other storm events can reveal the potentially deleterious effect of water pollution caused by floodplain and offshore infrastructure.

BACKGROUND

The National Flood Insurance Program (2005) defines a functionally dependent use as “a use which cannot perform its intended purpose unless it is carried out in close proximity to water. The term includes only docking facilities, port facilities that are necessary for the loading and unloading of cargo, and ship building, and ship repair facilities.” (Appendix D, p. D-5).

These building types serve essential functions such as transportation, and as an embarkation point for trade, commerce, fishing, and battle. The way to enter or leave a city was by ship and the harbor front represented new opportunity.

In times of peace, the seaside waterfront was a place for recreation and relaxation. Business prospered as boardwalks, amusement parks, hotels, and restaurants opened to accommodate the influx of inland residents and tourists eager for renewal. But when the tides run strong, seawalls and jetties, however sturdy, may only displace sea water and divert it towards other unprotected areas. Only if infrastructure is located (or relocated) out of the floodplain or constructed intelligently for resilience does it have a chance for survival.

Any scientific inquiry must consider the life forces and rhythms of nature before validating human intrusion into that environment. Rather than take a stance of resistance, one needs to consider resilience where nature is not considered as an opponent, but instead as a collaborator. This is the essence of sustainability. This is also having an acute sense of territorial intuition: where people can go and where people cannot go.

Take, for example, the synergy of waves along the barrier island seacoast. Waves roll up onto the beach, carry sand away, and then redistribute it in other places. This can depend on the depth of the ocean floor, tides, wind generated from pressure zone differentials, the material constitution of soil and rock, and many other factors. This is a dynamic place where change is constant. Why would anyone want to build a permanent structure in such a dangerous place? Although a view of a calm sea is gorgeous, a storm surge with thirty foot waves is absolutely terrifying.

Wetlands are another case in point. Historically, this area was looked at as a poisonous wasteland to be filled and reclaimed for urbanization. This environment has been seen as a dismal place of bogs and quicksand pits, infested with mosquitoes, poisonous snakes, and reptiles. It was not realized or appreciated that wetlands are transitional zones between water and land. Countless creatures, including shellfish, crustaceans, fish, birds, reptiles, and mammals, breed and interact in this food chain habitat that is ecologically essential for the survival of all species, including humans.

Certain wetland soils and plants also cleanse the environment by neutralizing toxins that transfer between land, sea, and air. Plants such as mangroves, willows, cedar, and bull rushes prevent soil from

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