GEOGRAPHY *and* PUBLIC POLICY

Beaches on the Brink

Headlines such as "Beaches on the Brink," "Storm-Lashed Cape Is a Fragile Environment," "Fighting the Development Tide," and "State Looks for Money to Restore the Shore," signal a growing concern with the condition of coastlines. In addition, they raise the central question of how we can utilize coastlines without, at the same time, destroying them.

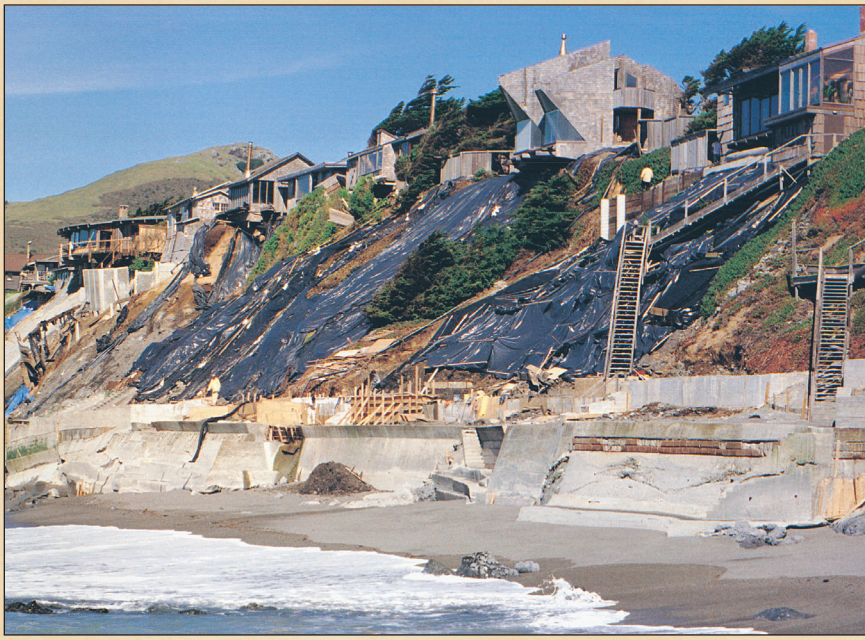
Because many of the world's people live or vacation on coasts, and because such areas are often densely populated, coastal processes have a considerable impact on humans. Nature's forces are continually shaping and reshaping the coasts; they are dynamic environments, always in a state of flux. Some processes are dramatic and induce rapid change: tropical cyclones (hurricanes and typhoons), tsunami, and floods can wreak havoc, take thousands of lives, and cause millions of dollars in damage in a matter of hours. A less hazardous process is beach erosion, although it tends to magnify the effects of storms.

Some beach erosion is caused by natural processes, both marine and land. Waves carry huge loads of suspended sand, and longshore currents constantly move sand along the shoreline. The weathering and erosion of sea cliffs produce sediment, and rivers carry silt from mountains to beaches.

Human activities affect both erosion and deposition, however. Dams, for example, decrease the flow of sand to the water's edge by trapping sediment upstream. We fill marshes, construct dikes, bulldoze dunes or remove their natural stabilizing vegetation. We hasten erosion when we build roads, houses, and other structures on cliffs and dunes, or when we plant trees and lawns on top of them.

Especially vulnerable to erosion are barrier islands, narrow strips of sand parallel to the mainland. Under natural conditions, they are not stable places; their ends typically migrate, and during storms, waves can wash right over them. Some barrier islands are highly developed and densely populated, including Atlantic City and Miami Beach.

Once hotels and condominiums, railroads, and highways have been built along the waterfront, people attempt to protect their investments by preventing beaches from eroding. Breakwaters, offshore structures built to absorb the force of large, breaking waves and to provide quiet water near shore, are designed to trap sand and thus retard erosion, but they are not always successful. Although some are locally beneficial by forming new areas of deposition, they almost invariably accelerate erosion in adjacent areas. The efforts of one community are often negated by those of nearby towns and cities, underscoring the need for agencies to coordinate efforts and develop comprehensive land use plans for an extensive length of shoreline.



An eroded cliffside in Bodega Bay, California.
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An alternative to erecting artificial structures is beach replenishment: adding sand to beaches to replace that lost by erosion. This provides recreational opportunities; at the same time, it buffers property from damage by storms. Sand may be dredged from harbors or pumped from offshore sandbars. The disadvantages of this technique are that dredging disrupts marine organisms, sand of the right texture may be hard to obtain, and replenished beaches can be short-lived. For example, more than $5 million was spent replenishing the beach at Ocean City, New Jersey, in

1982. The beach disappeared within 3 months, after a series of northeasters hit the area. Similarly, a massive dredging project that cost more than $17 million replenished 8 kilometers (5 mi) of beaches along the San Diego coast in 2000. Within months, after the largest waves of the year pounded the coast, more that half of the sand was gone.

The expense of maintaining coastal zones raises two basic questions: Who benefits? and Who should pay? Some people contend that the interests of those who own coastal property are not compatible with the public interest, and it is unwise to expend large amounts of public funds to protect the property of only a few. People argue that shorefront businesses and homeowners are the chief beneficiaries of shore protection measures, that they often deny the public access to the beaches in front of their property, and, therefore, they should pay for the majority of the cost of maintaining the shoreline. At present, however, this is rarely the case; costs are typically shared by communities, states, and the federal government. Indeed, 51 federal programs subsidize coastal development and redevelopment. The largest is the National Flood Insurance Program, which offers low-cost insurance to homeowners in flood-prone areas. People have used the protection of that insurance to build anywhere, even in high-risk coastal areas.

QUESTIONS TO CONSIDER

1. From 1994 to the present, the Army Corps of Engineers has spent millions of dollars annually to pump sand from the ocean bottom onto eroded beaches in New Jersey. This ongoing project is based on the assumption that additional replenishment will be required every 5 or 6 years as beaches erode. Currently, the federal government pays 65% of the cost, the state government 25%, and local governments 10%. New Jersey Senator Frank Lautenberg contends that beach replenishment is critical for the region's future. "People's lives and property are at stake. Jersey's beaches bring crucial tourist dollars to the state." But James Tripp of the Environmental Defense Fund argues that beach rebuilding is simply throwing taxpayers' money into the ocean. "Pumping all the sand in the world is not going to save the day." Do you think the beach replenishment project is a wise use of taxpayers' money? Does the federal government have an obligation to protect or rebuild storm-damaged beaches? Why or why not?
2. Coastal erosion is not a problem for beaches, only for people who want to use them. Do you believe that we should learn to live with erosion, not building in the coastal zone unless we are prepared to consider our structures temporary and expendable? Should communities adopt zoning plans that prohibit building on undeveloped lands within, say, 50 meters (164 ft) of the shore?
3. Should the federal government curtail programs that provide inexpensive storm insurance for oceanfront houses and businesses, as well as speedy grants and loans for storm repairs not covered by insurance? Should people be allowed to rebuild storm-damaged buildings even if they are vulnerable to future damage? Why or why not?
4. Coastal erosion will become more serious if the current rise in sea level—about 1 inch every 12 years—continues or even increases as global warming causes sea water to expand or the polar ice caps to melt. Many of the world's major cities would be threatened by this rise in sea level. What are some of those cities? How might they protect themselves?