

Economies built on sand

They say you can't turn back the tide, but people who live at the coast have certainly tried.

Since 1923, coastal communities have spent more than \$3 billion (in 2003 equivalent dollars) of federal, state, local and private money on beach nourishment projects to prevent or reduce shoreline erosion.

Wide, beautiful beaches attract tourists, enhance public recreation, boost property values and protect homes and businesses from flooding and storm damage. It's easy to understand why communities would want to protect such an asset.

But beach nourishment comes at a cost.

Each time new sand is dumped on an eroding beach, it kills the beach's invertebrate populations and disrupts local food chains, affecting the fish, birds and other wildlife that live or migrate there.

The people who benefit most from nourishment are those who own beachfront property, use the beach, or profit directly from beach tourism. Even for them, some of the benefits are fleeting: Records show that most nourished beaches need re-nourishment every four to seven years.

Clouds on the horizon

Long-term models developed at the Nicholas School suggest that global warming will increase the speed of shoreline erosion this century and beyond.

Along with accelerating sea level rise, changing storm patterns will likely pound our beaches with an altered pattern of wave attack. Buffeted by these waves, shorelines will rearrange themselves much faster than

in recent centuries. Nourishing part of the shoreline could significantly affect beaches up to 60 miles away, the models show.

An alternative approach would be to acknowledge the dynamic nature of the coast and take erosion and sea level rise into account when planning future development.

Some undeveloped beachfront lands should be protected, by placing them in public trust or through conservation easements on private land.

On developed coasts, a policy of retreat—moving away from an eroding shoreline—

removes people and buildings from harm's way. When retreat isn't feasible, nourishment should be considered on a case-by-case basis, weighing its benefits to property owners, tourists and regional economies against its engineering and environmental costs, including harm to beaches, marine life and the sites from which new sand

would be "borrowed."

Navigational channels, jetties and, in some regions, dams on coastal rivers can cut off beaches from their replenishing supply of sediment. Their impact needs to be reduced.

Beautiful beaches are a natural draw for tourism and development. But nourishing and re-nourishing them can harm the environment and may become increasingly costly as the speed of shoreline erosion increases.

Sustainable development that adapts to the shifting shore and acknowledges difficult tradeoffs between human development and coastal ecosystems is the best way to protect our beaches—and beach communities—for generations to come.



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