Sea level rise to alter economics of California beaches

February 28 2012

Rising sea levels are likely to change Southern California beaches in the coming century, but not in ways you might expect.

While some beaches may shrink or possibly disappear, others are poised to remain relatively large -- leaving an uneven distribution of economic gains and losses for coastal beach towns, according to a study by researchers at Duke University and five other institutions.

"Some beaches actually stand to benefit economically from sea level rise , creating winners and losers among California beach towns," said Linwood Pendleton, director of ocean and coastal policy at Duke's Nicholas Institute for Environmental Policy Solutions. "We found, as relatively small beaches shrink more due to sea level rise, people will stop visiting them, opting for wider beaches."

The study "Estimating the Potential Economic Impacts of Climate Change on Southern California Beaches," is featured in a special edition of the peer-reviewed journal Climatic Change.

Through the use of several models, the authors simulated the effects of climate change on beach size, beach attendance and beach-goer spending at 51 public beaches in Los Angeles and Orange counties. The data were run for two scenarios: long-term losses in beach size caused by a 1-meter rise in sea level over the next 100 years; or short-lived beach erosion resulting from a year of severe winter storms and high tides associated with sea level rise.

Slow and steady sea level rise will reduce the width of all beaches in the two counties, the researchers found, causing some visitors to drive farther to reach wider shores. Small beaches like Laguna Beach would lose as much as $14 million yearly in beach-related expenditures while larger beaches, like Huntington, would see an annual gain near $16 million annually.

In the second scenario, researchers examined a year characterized by severe winter storms and higher tides -- the El Niño winter of 1982-83. In this year, faster-paced erosion occurred that deposited lost sand at other beaches. The impact of a single, extremely stormy year on revenue created upward and downward swings in beach revenue in the model, nearing $25 million annually. Those benefiting as a result of the changes would be much different than in the first scenario, with Laguna now the biggest winner under the stormy conditions.

The authors said that bringing in more sand through nourishment projects could help offset the losses, but the costs would be great -- roughly $436 million to keep pace with slow, steady sea level rise and near $382 million to repair the effects of a single stormy year.

"While offsetting the effects of long-term sea level rise through nourishment might make economic sense, the costs of fixing the short-term impacts of more damaging winter storms is much higher than any benefits that could be gained," Pendleton said. "Faced with this scenario, most beach towns would be forced to wait for natural processes to slowly replace the sand taken by big storms."

Though the models indicated beach size had a significant influence on whether residents chose a beach, the study found other amenities did too. Adding lifeguards, convenient parking and improving water quality could help make up for some of the lost sand.

"While the focus is often on battling nature to protect sand, it may be far easier and cheaper for beach towns to look to other amenities that are within their control," Pendleton added.

More information: To read the article in *Climatic Change*, visit: www.springerlink.com/content/446287535w50p275/

Provided by Duke University