

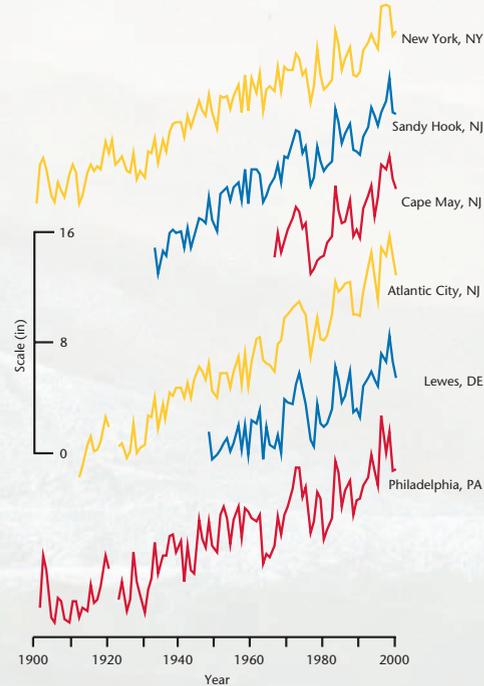
## Global Warming and The Coast

Carbon dioxide and other gases in the atmosphere let sunlight penetrate to the Earth's surface but retain heat that would otherwise escape into space. This mechanism is called the "greenhouse effect" because it is somewhat like the way that the glass in a greenhouse traps heat.

The atmosphere's greenhouse effect keeps the Earth 60°Fahrenheit warmer than it would be otherwise. But human activities, such as burning oil, coal, and natural gas in everything from power plants to cars and boats, are increasing the concentration of greenhouse gases. As a result, the Earth has warmed almost 1°Fahrenheit in the last century.

Warmer temperatures can increase the intensity of severe rainstorms. Higher temperatures also raise sea level by expanding ocean water and melting mountain glaciers. Along the New Jersey shore, rising sea level erodes beaches, increases flooding, and threatens coastal habitat.

Sea Level Trends 1900 - 2000



Manasquan, December 19, 1992, Courtesy of Norbert Psuty

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### For More Information

- See the U.S. Environmental Protection Agency's Global Warming Site at [www.epa.gov/globalwarming/sealevelrise](http://www.epa.gov/globalwarming/sealevelrise).
- Contact New Jersey's Department of Environmental Protection at [www.state.nj.us/dep](http://www.state.nj.us/dep) or call them at 609-292-2885.
- For information on flood insurance, call 800-480-2520 and ask for a booklet titled "Answers to Questions About the National Flood Insurance Program."



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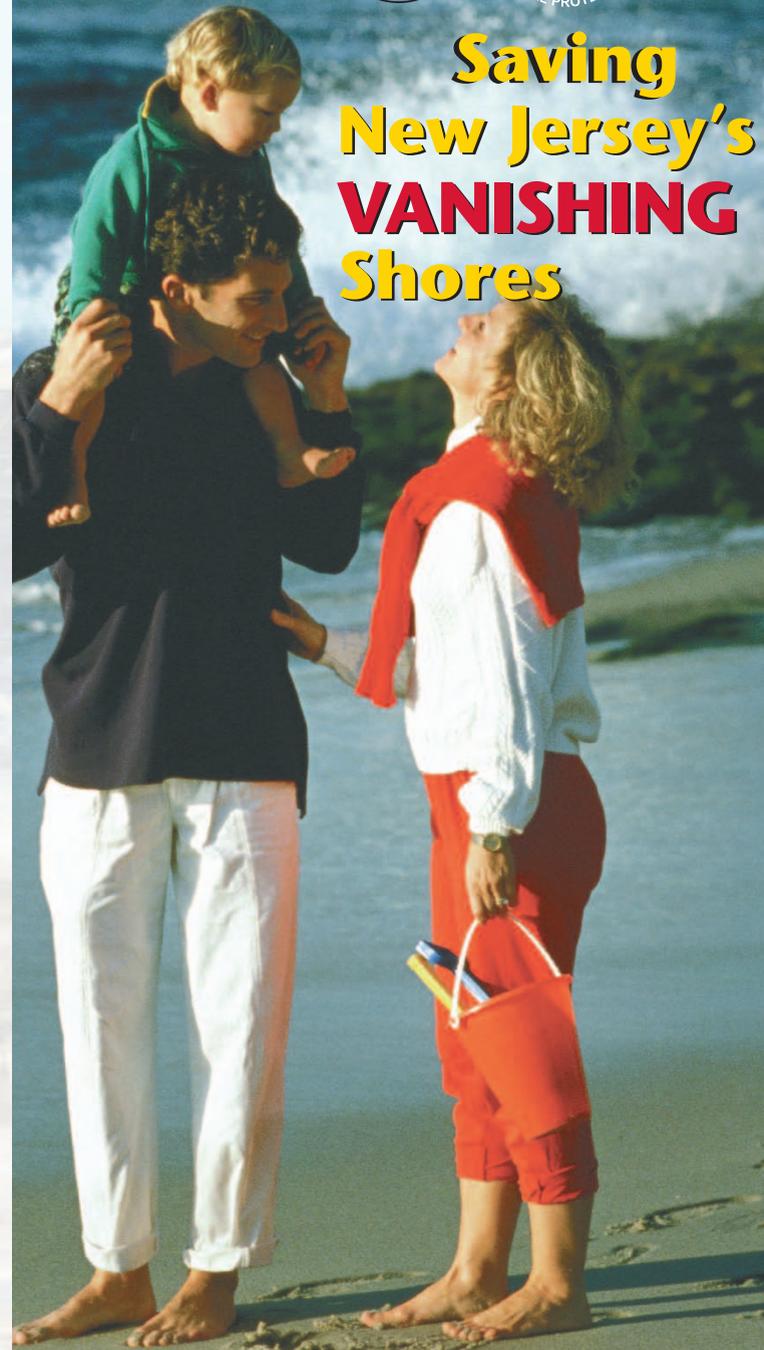


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Seaside Park, January 7, 1997, Courtesy of Norbert Psuty



## Saving New Jersey's VANISHING Shores



## Are New Jersey's Beaches Disappearing?

Most beaches along the Atlantic and Gulf Coasts of the United States are eroding a few feet per year. In some locations, jetties, storms, seawalls, and motorboats cause the erosion. But rising sea level is the primary reason that most shores erode. Along the New Jersey shore, sea level is rising 1 inch every 6 years. Both rising global temperatures and gradually sinking land contribute to the higher water levels—and that means more erosion.

In some other coastal states, homeowners are removing their oceanfront houses along eroding shores. The beach survives, but the building is lost. And along bay shores, owners often protect their homes from erosion by replacing the natural beach with wooden walls (bulkheads) or piles of rock (revetments). The property survives, but the beach is lost. Other states have implemented "rolling easements" that allow long-term maintenance of the public shoreline without triggering a public taking.

Here along the New Jersey shore, people want to keep both the beach and their homes. Depending on when you visit, you may see dump trucks releasing sand and bulldozers spreading it to rebuild a beach. Or a dredge pumping sand from the sea floor through a pipe to the beach. Or homeowners putting up snow fencing and planting grasses to hold the dunes.

Without these activities, some communities would lose their beaches, while others would lose their shorefront homes, condominiums, hotels, and other buildings.



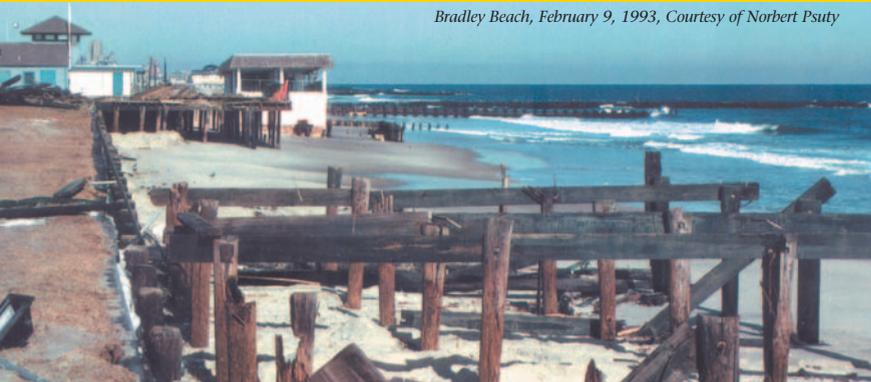
Brant Beach, February 9, 1998, Courtesy of Norbert Psuty

## Why Care About Erosion?

**Most of the Jersey shore is developed. As the sea rises, the beach is squeezed between the sea and the first row of buildings. Along ocean shores, this means less room for vacationers and local residents to sunbathe, play volleyball, or build sandcastles. Along the bays, there is less room for sandpipers, horseshoe crabs, and other wildlife that feed or breed in the sandy habitat.**

**Along the coast of New Jersey, sea level has risen 12 to 16 inches in the last century, mostly because the Mid-Atlantic coast is sinking. Rising global temperatures contributed 2 to 5 inches to sea level in the last century, but they could raise the sea another 1 to 3 feet in the next century, in addition to the rise caused by other factors.**

Bradley Beach, February 9, 1993, Courtesy of Norbert Psuty



## Storms May Do More Damage

Hurricanes and other storms can raise the sea temporarily by 5 to 10 feet—or more. Higher seas bring higher floods.

The narrowing beaches also could enable large waves to reach oceanfront buildings, roads, and boardwalks. Along the bays, where land elevations are lowest, increased rainfall from global warming could intensify coastal flooding even more.

The Federal Emergency Management Agency estimates that a 1-foot rise in sea level could increase flood insurance premiums by 35 to 60 percent. Not only will permanent residents be faced with higher premiums, hotels and landlords generally will pass these costs on to visitors.

## What About Wetlands?

Coastal marshes and bay beaches provide habitat for New Jersey's horseshoe crabs, ribbed mussels, fiddler crabs, seaside sparrows, redwinged black-birds, osprey, and other species of wildlife.

New Jersey's coastal wetlands are mostly within 2 feet of sea level, and many are eroding already. Hence even a moderate rise in sea level could threaten these ecosystems.

**Even today, many bay beaches and narrow strips of wetlands are being squeezed between the advancing sea and increasing coastal development.**



Sea Isle City, February 1998, Courtesy of Mark Mauriello

## What Is New Jersey Doing?

- The state sets aside \$15 million per year for shore protection and sand replenishment.
- All New Jersey coastal communities participate in the National Flood Insurance Program, which insures buildings against flood damages. Approximately 161,000 property owners in New Jersey have federal flood insurance policies.
- The state's Coastal Area Facilities Review Act discourages construction that would later require seawalls.
- The New Jersey Department of Environmental Protection has called for a reduction in the state's greenhouse gas emissions to 3.5 percent below 1990 levels by 2005.
- Coastal planners and municipal officials can now access and share information about New Jersey's coastal environment using the Geographic Information System (GIS).
- Warner-Lambert, a pharmaceutical company in New Jersey, installed more than 19,000 light bulbs with more efficient bulbs and saved 1.7 million kilowatt-hours of electricity per year.

## What Can You Do?

- When visiting Atlantic City or the North Jersey Shore, take the train.
- If you own a shorefront home threatened by erosion, haul in sand or plant vegetation to hold back the sea rather than building a seawall.
- Enjoy the sea breeze, listen to the waves, and turn off the air conditioner.
- When it's time to replace your car, consider one that gets more miles per gallon than your present vehicle.
- Avoid walking on sand dunes and destroying their ability to protect the shorelines from storms and erosion.
- When it's time to replace an appliance, look for the ENERGY STAR® label identifying energy-efficient models.
- If your home is at risk, talk to your insurance agent about federal flood insurance. *Home-owners insurance does not cover flood damages.*
- Buy products that feature reusable, recyclable, or reduced packaging to save the energy required to manufacture new containers.



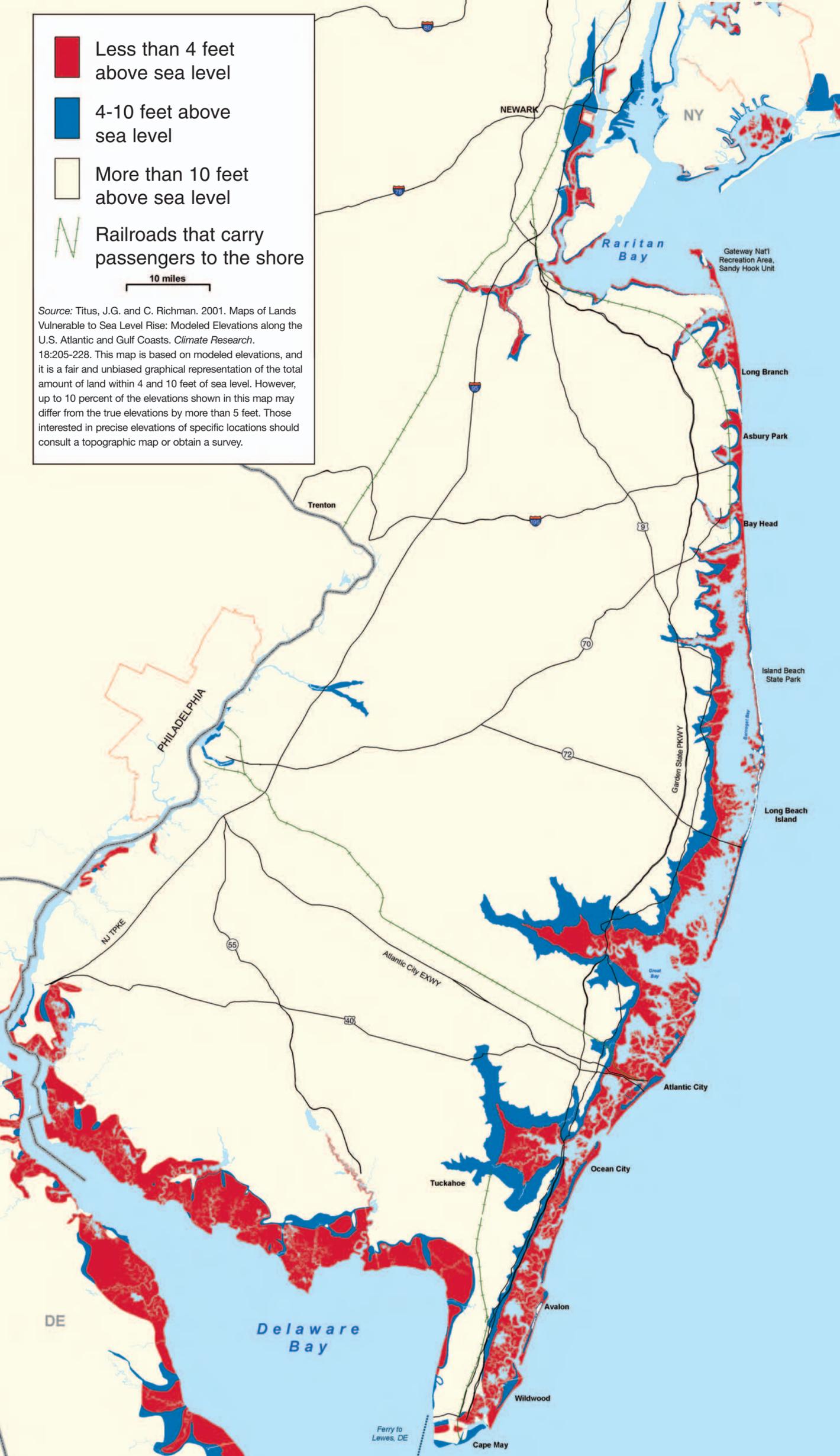
Long Beach Island, March 1995, Courtesy of Mark Mauriello

**Save our VANISHING shores.**

# New Jersey's Vulnerability to Sea Level Rise

- Less than 4 feet above sea level
- 4-10 feet above sea level
- More than 10 feet above sea level
- Railroads that carry passengers to the shore

Source: Titus, J.G. and C. Richman. 2001. Maps of Lands Vulnerable to Sea Level Rise: Modeled Elevations along the U.S. Atlantic and Gulf Coasts. *Climate Research*. 18:205-228. This map is based on modeled elevations, and it is a fair and unbiased graphical representation of the total amount of land within 4 and 10 feet of sea level. However, up to 10 percent of the elevations shown in this map may differ from the true elevations by more than 5 feet. Those interested in precise elevations of specific locations should consult a topographic map or obtain a survey.



**N**ew Jersey has 1,000 square miles of land within 4 feet of sea level—an area the size of Rhode Island.

Because the high water mark tends to be about 2 feet above sea level, almost all of this land would be flooded during high tides if the sea rises 2 feet during the next century, as expected. Along Delaware Bay, tidal flooding will convert some low agricultural lands to marsh. Along the low bay sides of Long Beach Island and other barrier islands, flooding will continue to become more frequent, prompting many people to elevate their yards with additional sand and gravel and to jack up their homes on pilings. Although the ocean sides of most barrier islands are high enough to avoid direct inundation, the rising sea level increases beach erosion and the cost of successful beach restoration projects.

Lands between 4 and 10 feet above sea level are likely to experience increased flooding from both higher sea level and the increased intensity of rainstorms.