

# Taming the Tide: Engineering for Coastal Resilience

## THE PROBLEM:

### How Tides and Surges Threaten Coastlines

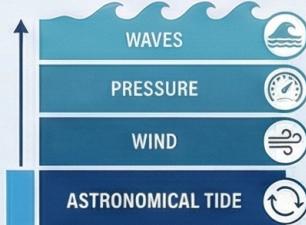


#### Sun & Moon Alignment Creates Extreme "Spring Tides"



When the sun and moon are aligned (full/new moon), their combined gravity creates the highest tides.

#### Storm Surge Components Magnify Coastal Flooding



Total water level is a combination of the astronomical tide, wind, pressure, and waves.



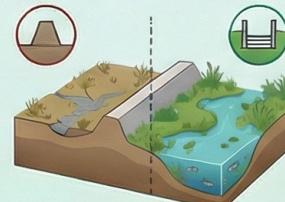
**Case Study: Chronic Flooding in Greenwich, NJ**  
During high tide, critical infrastructure like roads (levees) are regularly overtopped and leak.

## THE SOLUTION:

### Engineering for Protection and Restoration

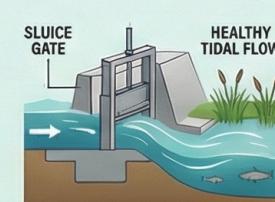


#### The Challenge: Balancing Flood Control vs. Ecosystem Health

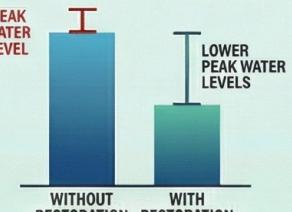


Restricting tidal flows protects property but degrades valuable upstream wetland habitats.

#### Solution: Managed Tidal Flow with Sluice Gates



#### RESTORATION CAN REDUCE OVERALL FLOOD RISK



Models show that restoring full tidal flow can lower peak water levels during moderate rainfall events.