

Flood Hazards, Risk, and Resilience

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INSTITUTE FOR PUBLIC ADMINISTRATION | IPA



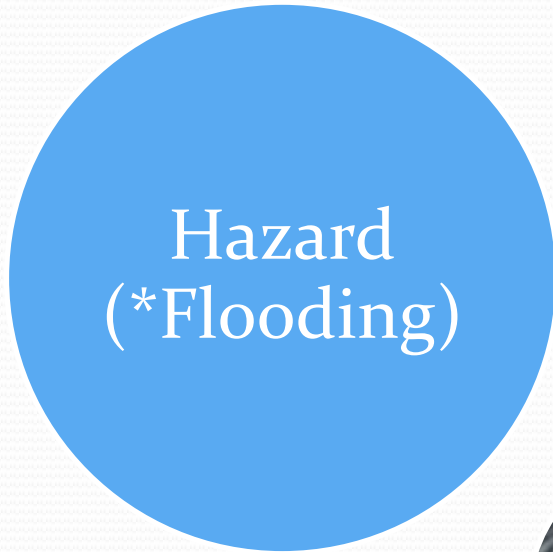
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Sea
Grant
DELAWARE



DELAWARE DEPARTMENT OF
NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL

Understanding Flood Risks



Heavy
Precipitation
Events



Coastal
Storms



Tidal



Sea Level
Rise

Heavy Precipitation Events



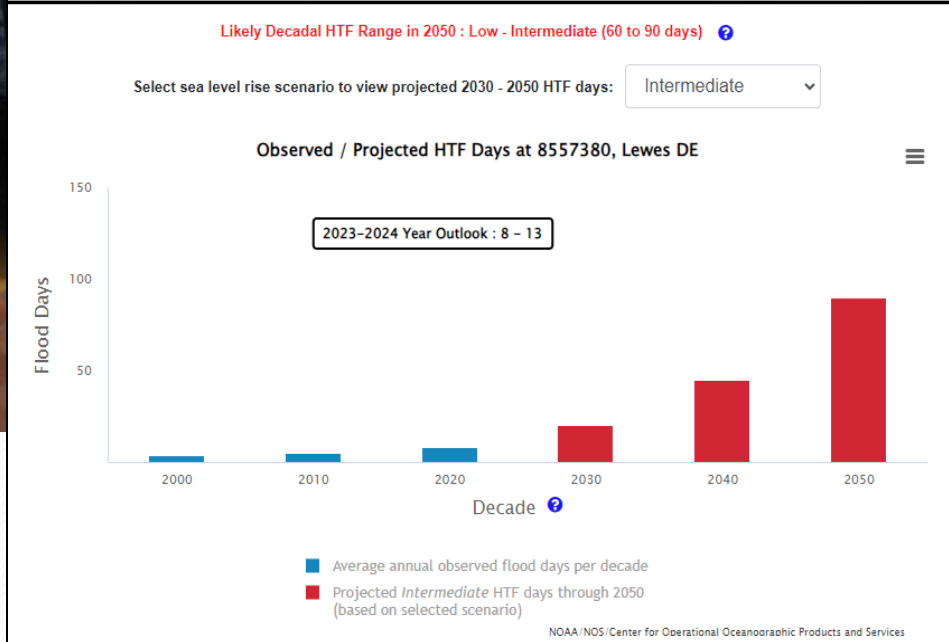
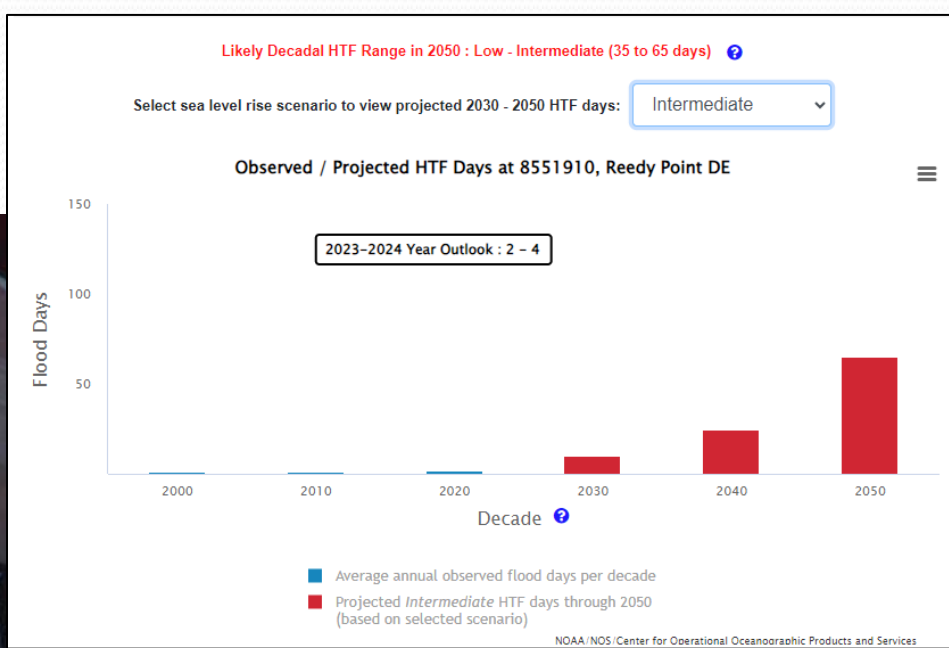
Newark, DE, 2016

Coastal Storms



October 29, 2021 in Dewey Beach, DE credit: Ellen Driscoll, Cape Gazette

High Tide Flooding



*Source: NOAA Annual High <https://tidesandcurrents.noaa.gov/high-tide-flooding/annual-outlook.html?station=8551910>



Sea Level Rise

- Appears as an increase in average tide height over time
- Up to 1 ½ feet of sea level rise by 2050
- Rate of sea level rise is accelerating

Angola and Long Neck at 2 ft SLR.

Source: NOAA Sea Level Rise Viewer <https://coast.noaa.gov/slr/>



More
damaging
flooding and
erosion
expected

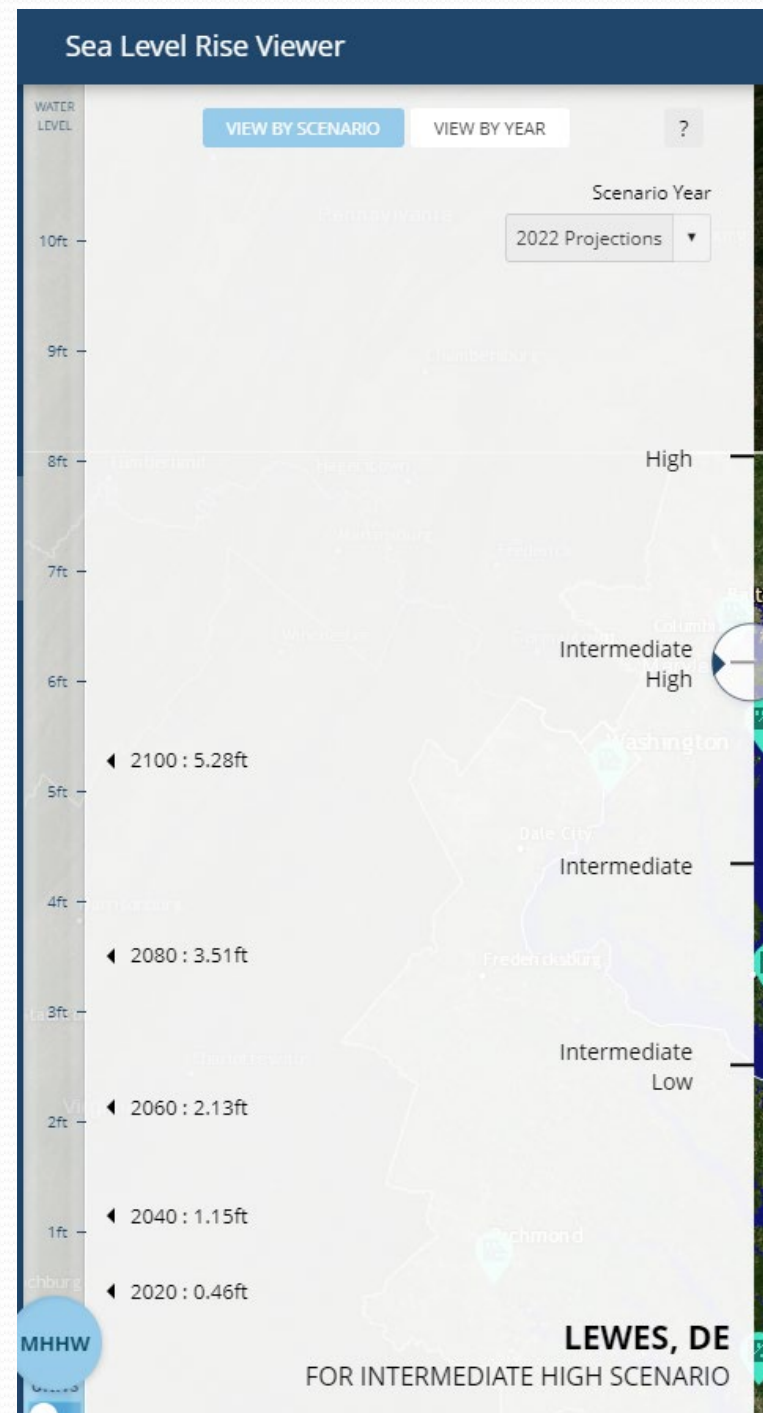
Sea level rise will create a profound shift in coastal flooding over the next 30 years by causing tide and storm surge heights to increase and reach further inland. By 2050, “moderate” (typically damaging) flooding is expected to occur, on average, more than 10 times as often as it does today, and can be intensified by local factors.

– NOAA Sea Level Rise Technical Report

Planning With Uncertainty

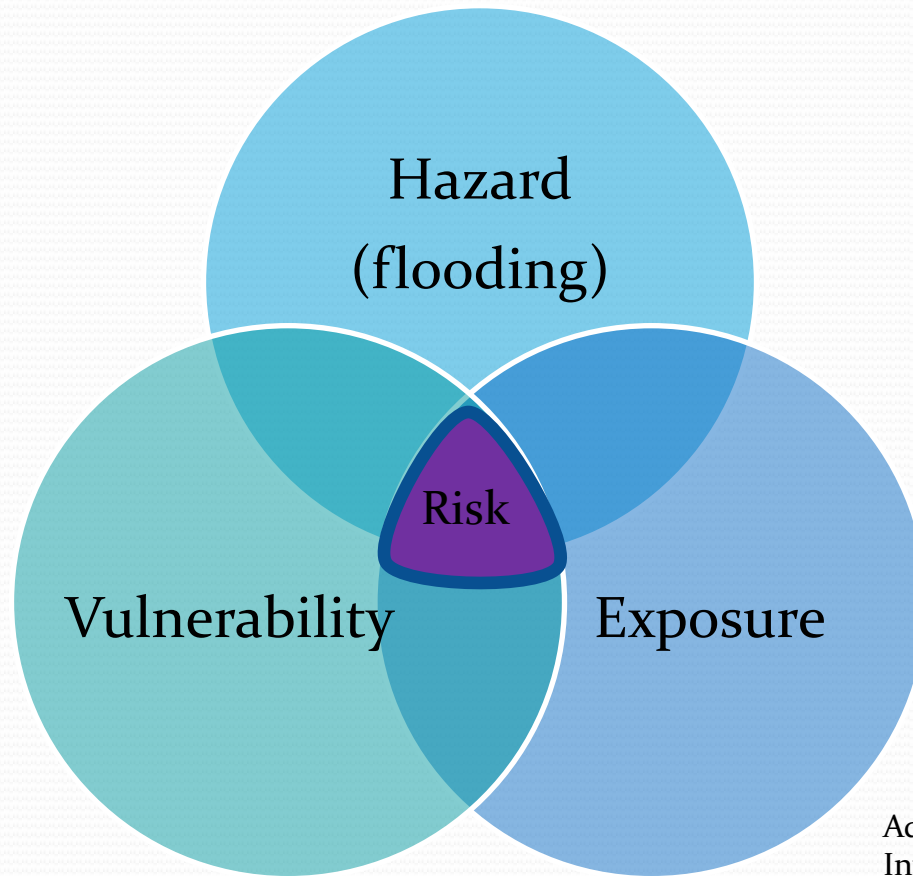
- Uncertainty is inherent in science and policy-making
- Ignoring it conceals risks and undermines risk management
- Not including some wiggle room increases the potential for maladaptation
- Flexible, adaptive management allows course corrections

Source: NOAA Sea Level Rise Viewer <https://coast.noaa.gov/slr/>



LEWES, DE
FOR INTERMEDIATE HIGH SCENARIO

Risk = Hazard + Exposure + Vulnerability



Adapted from FEMA, IS-393.A
Introduction to Hazard Mitigation

Exposure



People



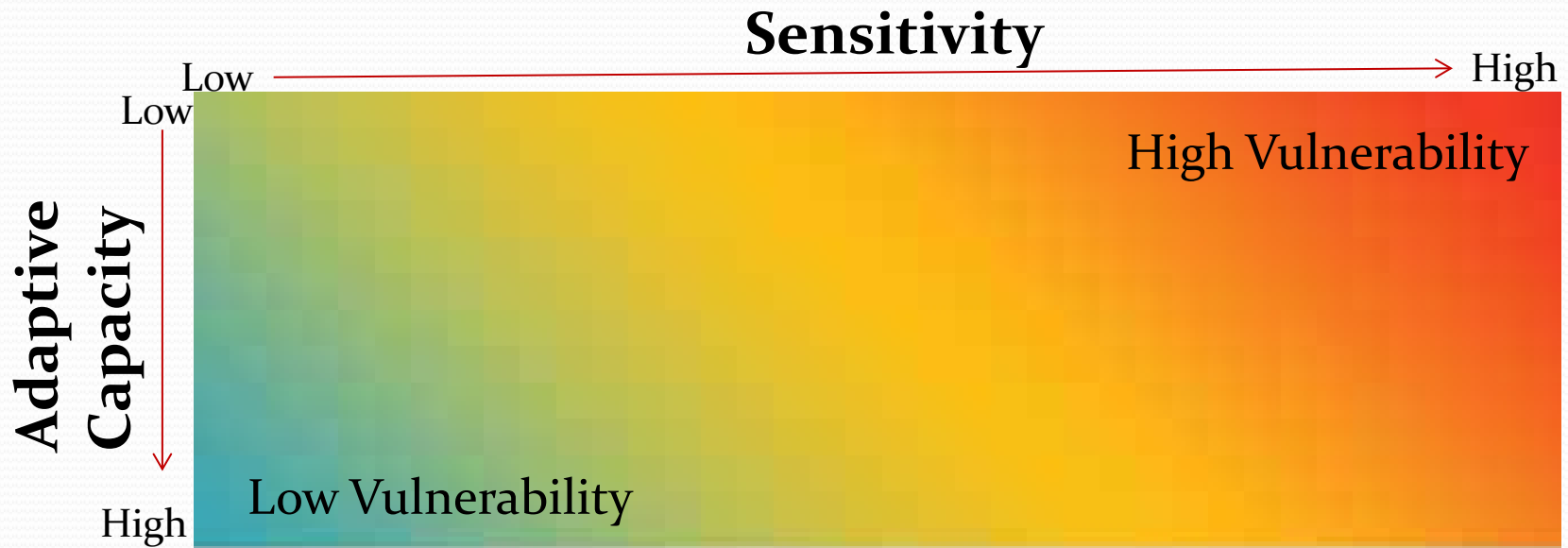
Property



Natural & Built
Infrastructure



Adapted from FEMA, IS-393.A
Introduction to Hazard Mitigation



Graphic courtesy of Daniella Hirschfeld, The Resiliency Place

Sensitivity and Adaptive Capacity are important considerations for Vulnerability

Sensitivity



Adaptive Capacity





Which home is more vulnerable to flooding?

Resilience:

The ability to bounce back after disruptive events



Wilmington, DE

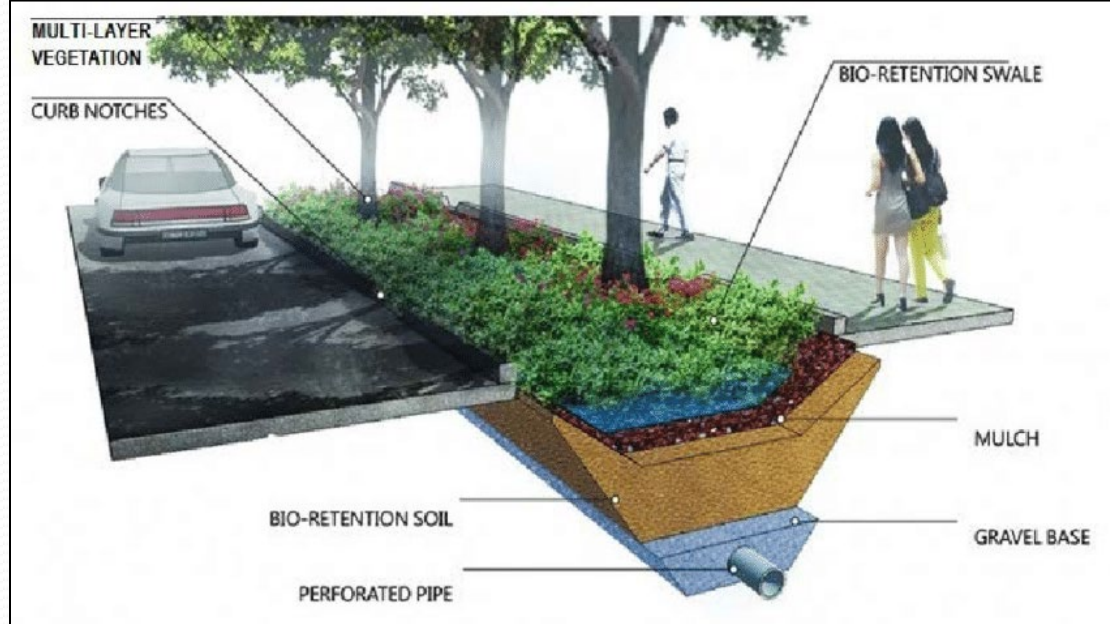


How long before life returns to “normal?”

Resilience Requires a Comprehensive Approach to Planning



Accommodate



Protect

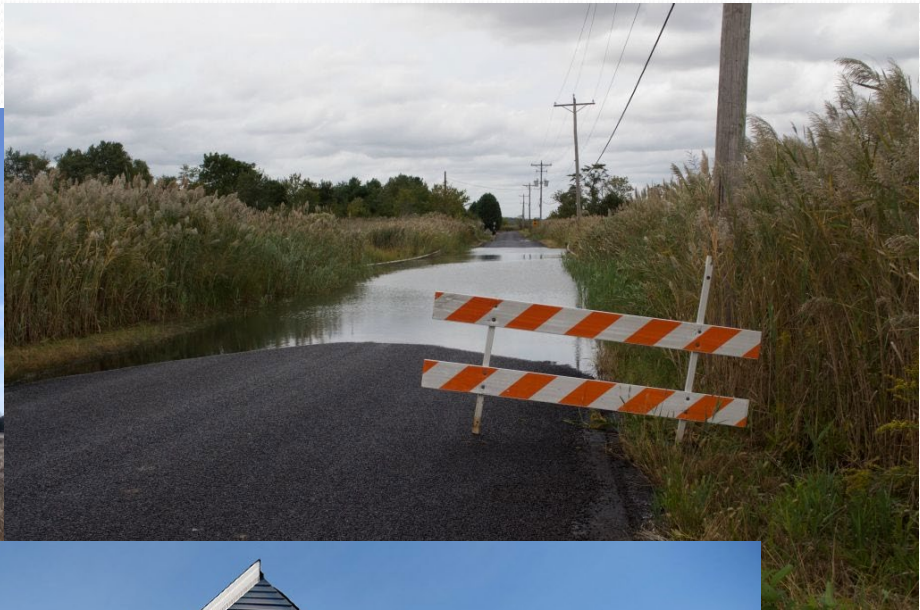


Retreat

Avoid



Open space preservation



Old Corbitt Road

Home demolition

Potential Resiliency Tools

Building codes and ordinances

Nature-based solutions

Designing/retrofitting infrastructure to higher standards

Robust emergency operations and recovery planning

Building redundancy into critical town operations

Monitoring conditions and gathering data

Resilience fund or capitol improvement fund

Town staff with skills to carry out resilience planning

Education and outreach

Social and professional networks

For ideas, turn to: Maryland CoastSmart Communities Scorecard

<http://dnrweb.dnr.state.md.us/CoastSmart/pdfs/scorecard.pdf>

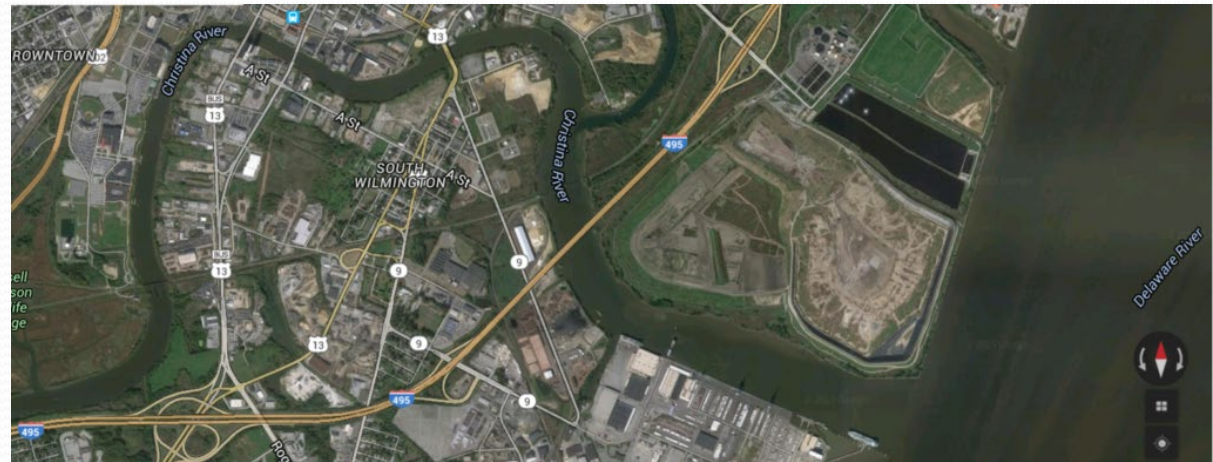
The natural floodplain provides many essential functions and benefits

Do:

- Invest in nature-based infrastructure

Don'ts:

- Minimal buffers
- Use of fill
- Degradation of natural resources
- Impervious surfaces
- Maximum lot coverage



Physical infrastructure: design it with future conditions in mind and properly maintain/upgrade systems



Invest in Our Civic and Social Infrastructure



- Identify vulnerable populations and their proximity to services
- Expand social services to address gaps
- Support social networks, emergency responders, and disaster response & recovery groups
- Establish local resilience and sustainability funds
- Encourage the hiring of staff with specific skill sets



Participating counties/towns

Rating

DELAWARE CITY, CITY OF	DE	9
NEWARK, CITY OF	DE	7
NEW CASTLE, CITY OF	DE	8
LEWES, CITY OF	DE	8
SEAFORD, CITY OF	DE	9
SOUTH BETHANY, TOWN OF	DE	9
DEWEY BEACH, TOWN OF	DE	9
BETHANY BEACH, TOWN OF	DE	8
FENWICK ISLAND, TOWN OF	DE	9
NEW CASTLE COUNTY	DE	5
REHOBOTH BEACH, CITY OF	DE	8

Invest in CRS: In the CRS program, flood insurance premiums are discounted to reflect a community's efforts to mitigate and avoid flooding: *1 county and 10 towns participate in Delaware*

Thank You!

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