The N.J. Coastal Resilience Collaborative:

Building Partnerships and Networks
to Advance Coastal Community Resilience

NJ COASTAL RESILIENCE COLLABORATIVE

TECHNICAL ASSISTANCE COFFEE CHAT

FOR NJ COASTAL COMMUNITIES

The views expressed during this Technical Assistance Coffee Chat are the presenter's own and do not reflect the official policies or positions of the New Jersey Coastal Resilience Collaborative or any of its organizational partners.

The N.J. Coastal Resilience Collaborative:

Building Partnerships and Networks to Advance Coastal Community Resilience

NJ PACT REAL Panel Speakers

Stormwater & Flood Hazards

Lindsey Massih,
NJ Future

Anushi Garg,
Environmental Defense Fund

Christopher Schmitt,
GZA Environmental Inc.

Pritpal Bamhrah,
Rutgers University

Caleb Stratton,
City of Hoboken

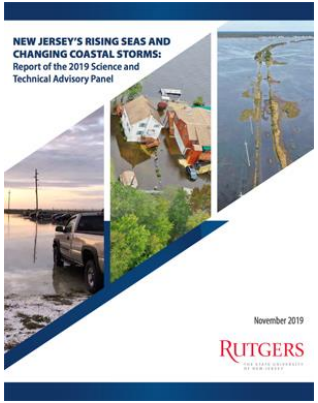
Resilient Environments and Landscapes (REAL)

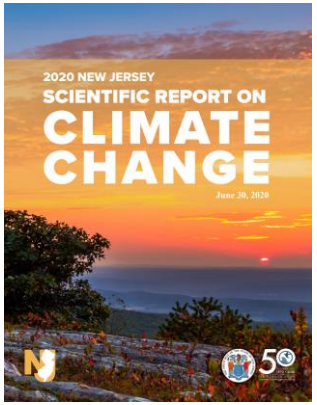
"NJDEP is modernizing land resource protection rules to better support New Jersey communities, residents, and businesses in building their resilience to sea-level rise, extreme weather, chronic flooding, and other impacts of our changing climate."

- **NJDEP REAL Website (https://dep.nj.gov/njpact/)**

Proposes amendments to several environmental regulations, including the Flood Hazard Area Control Act Rules, Freshwater Wetland Protection Act Rules, Coastal Zone Management Rules, and Stormwater Management Rules

How We Got Here





SUPERSTORM SANDY HITS NJ
Changed the way many New Jerseyans think about climate change and resiliency

Rutgers University re-convened the Panel on behalf of NJDEP to update the 2016 report

NJDEP releases their first scientific report on the current state of knowledge regarding the effects of climate change on NJ

2012

2016

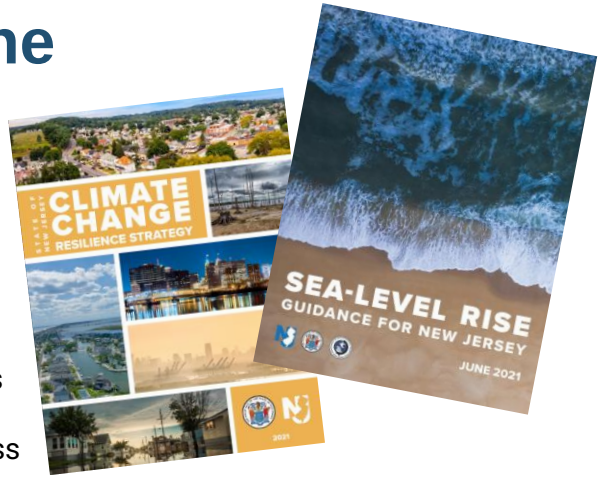
Rutgers University convened a **New Jersey Science and Technical Advisory Panel (STAP)** on Sea Level Rise and Changing Coastal Storms

2019

EXECUTIVE ORDER 89 ISSUED
Directed the creation of a Climate Change Resiliency Strategy and Climate Flood Resilience Program

2020

NJ PACT Timeline



Series of webinars & engagement hosted by NJDEP throughout the timeline

NJDEP STRATEGIES & GUIDANCE RELEASED
Recommendations on actions for mitigating and adapting to climate change impacts across communities, sectors, and agencies

IFP RULE EFFECTIVE
Effective July 17, 2023

REAL

WE ARE HERE AND TIME IS NOW

2020

2021

2022

2023

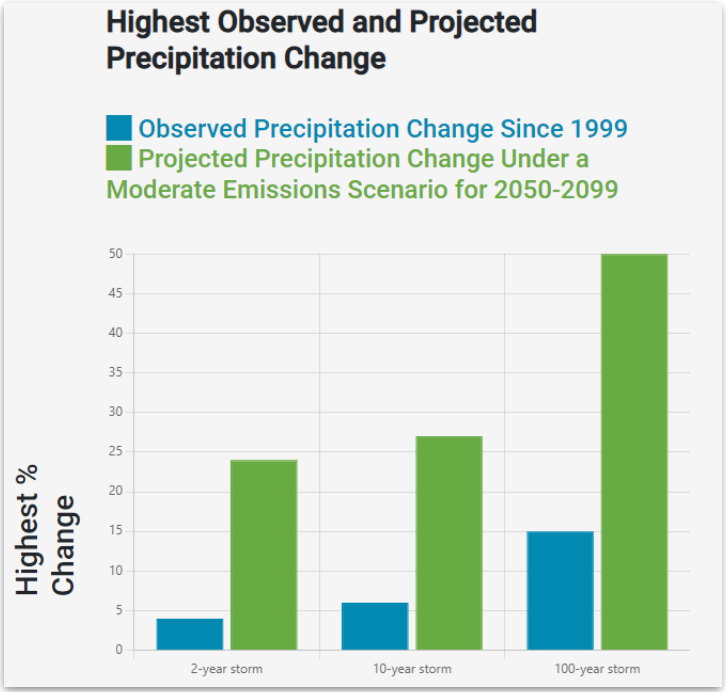
2024

EXECUTIVE ORDER 100 ISSUED
Required NJDEP to adopt "Protecting Against Climate Threats" regulations within 2 years AKA NJ PACT

INLAND FLOOD PROTECTION (IFP) RULE ISSUED
Formalized requirements for raising homes and roadways in inland areas and revised stormwater management requirements

RESILIENT ENVIRONMENTS AND LANDSCAPES (REAL) ISSUED
Courtesy copy issued May 2024
Comment period opened August 5, 2024
Comments due November 3, 2024
Estimated to be effective July 2025

CLIMATE CHANGE IN NJ



IFP Rule Justification
NOAA Precipitation Study (2021)

Ida case studies show average flood elevations of 3.1 feet above FEMA's 100-year flood elevation

CLIMATE CHANGE IN NJ

New Jersey Sea-Level Rise above the year 2000 (1991-2009 average) baseline (ft)*

		2030	2050	2070			2100			2150		
				Emissions								
	Chance SLR Exceeds			Low	Mod.	High	Low	Mod.	High	Low	Mod.	High
Low End	< 95% chance	0.3	0.7	0.9	1.0	1.1	1.0	1.3	1.5	1.3	2.1	2.9
Likely Range	< 83% chance	**0.5**	**0.9**	**1.3**	**1.4**	**1.5**	**1.7**	**2.0**	**2.3**	**2.4**	**3.1**	**3.8**
	< 50% chance	**0.8**	**1.4**	**1.9**	**2.2**	**2.4**	**2.8**	**3.3**	**3.9**	**4.2**	**5.2**	**6.2**
	< 17% chance	**1.1**	**2.1**	**2.7**	**3.1**	**3.5**	**3.9**	**5.1**	**6.3**	**6.3**	**8.3**	**10.3**
High End	< 5% chance	1.3	2.6	3.2	3.8	4.4	5.0	6.9	8.8	8.0	13.8	19.6

*2010 (2001-2019 average) Observed = 0.2 ft

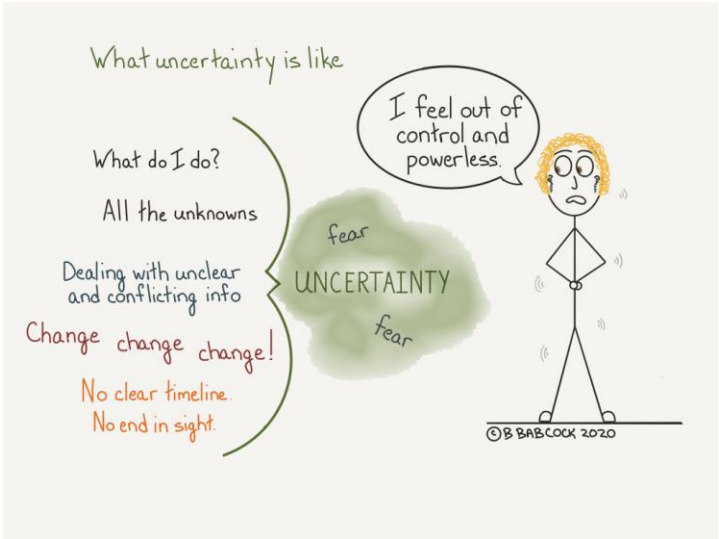
From Rutgers' STAP Report (2019)
NJDEP Using 2100, moderate emissions, <17% likely range

Uncertainty is inherent to science!

- The Intergovernmental Panel on Climate Change (IPCC) has addressed the issues of the uncertainty that accompanies evolving science and projections.

- ‘Low confidence’ does not indicate lower quality than a ‘high confidence’ estimate of sea level rise: rather, confidence is used to qualify the degree of agreement and level of evidence around the processes that are used as inputs into the sea level rise estimates.

- The 2019 STAP report addresses uncertainty by accounting for a number of possible factors and **the result is an effective and usable range of projections**.



REAL RULE CHANGES

1. Flood Hazard Area Control Act Rules (Coastal)
2. Coastal Zone Management Rules
3. Stormwater Management Rules
4. Freshwater Wetlands Protection Act Rules
5. Other rule areas that reference the above

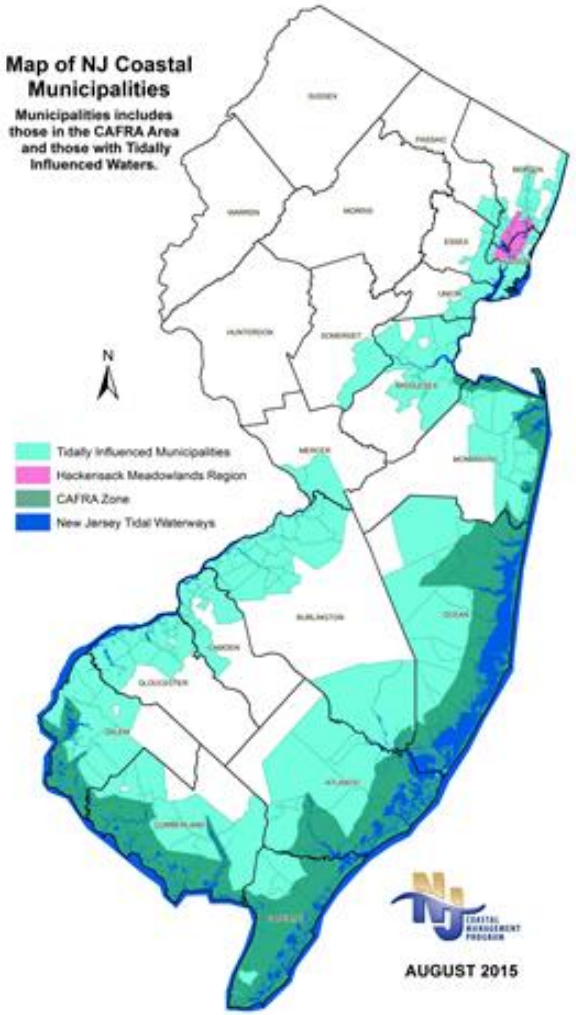
FLOOD HAZARD AREA CONTROL RULES

TIDAL VS. FLUVIAL FLOODING

Flooding from ocean with stormwater influence

Flooding from rivers with stormwater influence

When obtaining a permit from NJDEP, it is often necessary to know the limits of the flood hazard area, floodway, and/or riparian zone



NJ PACT REAL:
Sea level rise, Flood damage, and Inundation Risk Zones

Anushi Garg, Senior Analyst,
NY-NJ Resilient coasts and Watersheds
Environmental Defense Fund

New Climate Adjusted Flood Elevation (CAFE) in coastal flood hazard areas

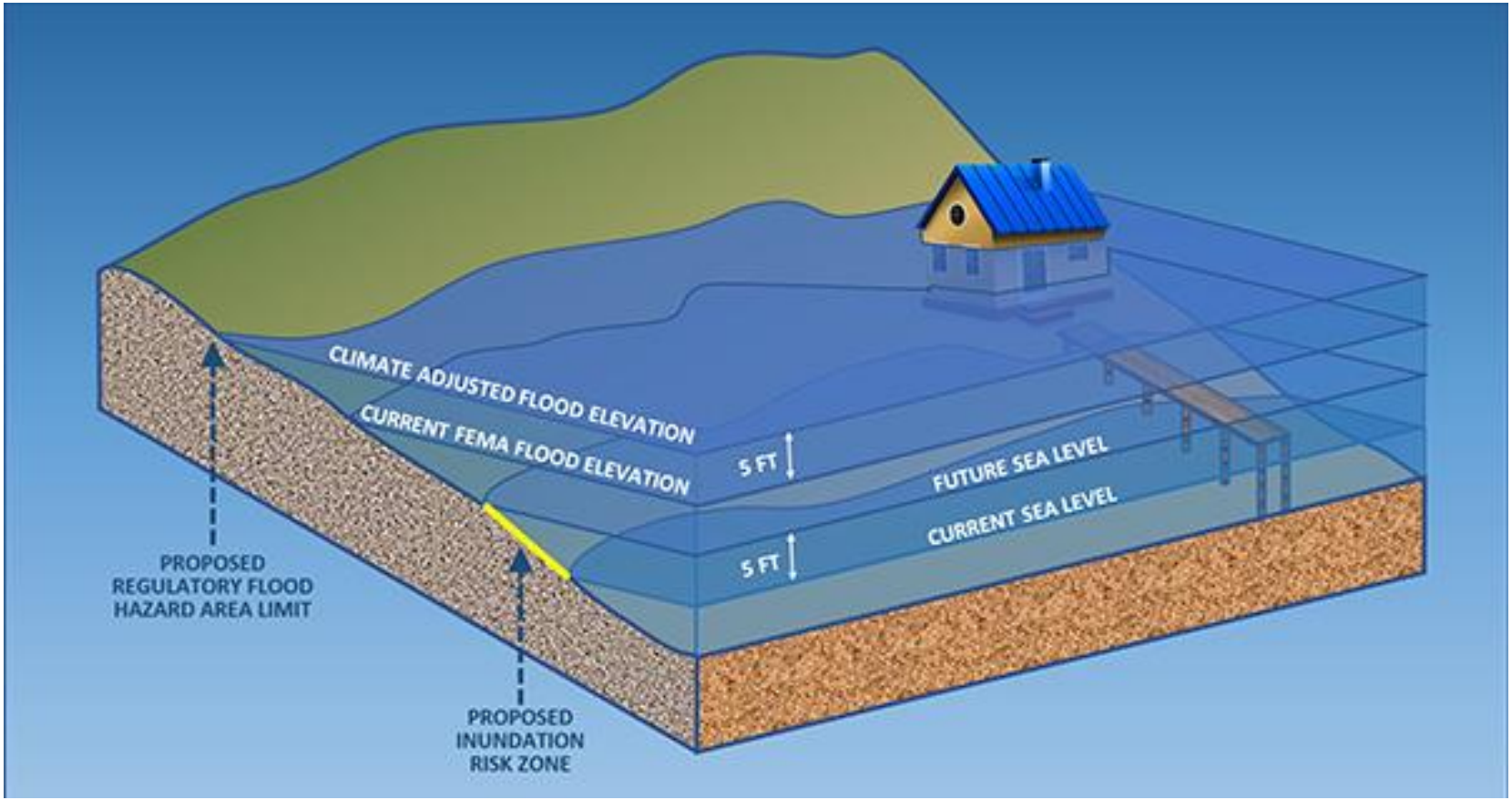
Current flood elevation (BFE) or FEMA's 100-year flood elevation in coastal flood hazard areas

+ 5 ft

+ 1 ft of freeboard

Implications?

- Flood zone jurisdictional area moving further inland
- Residential 1st Floors must be raised 6 FT above BFE
- Commercial uses raised 6FT*
- Roadways to be raised 6 FT*


CLIMATE ADJUSTED FLOOD ELEVATION
CURRENT FEMA FLOOD ELEVATION
5 FT
FUTURE SEA LEVEL
CURRENT SEA LEVEL
5 FT
PROPOSED
REGULATORY FLOOD
HAZARD AREA LIMIT
PROPOSED
INUNDATION
RISK ZONE

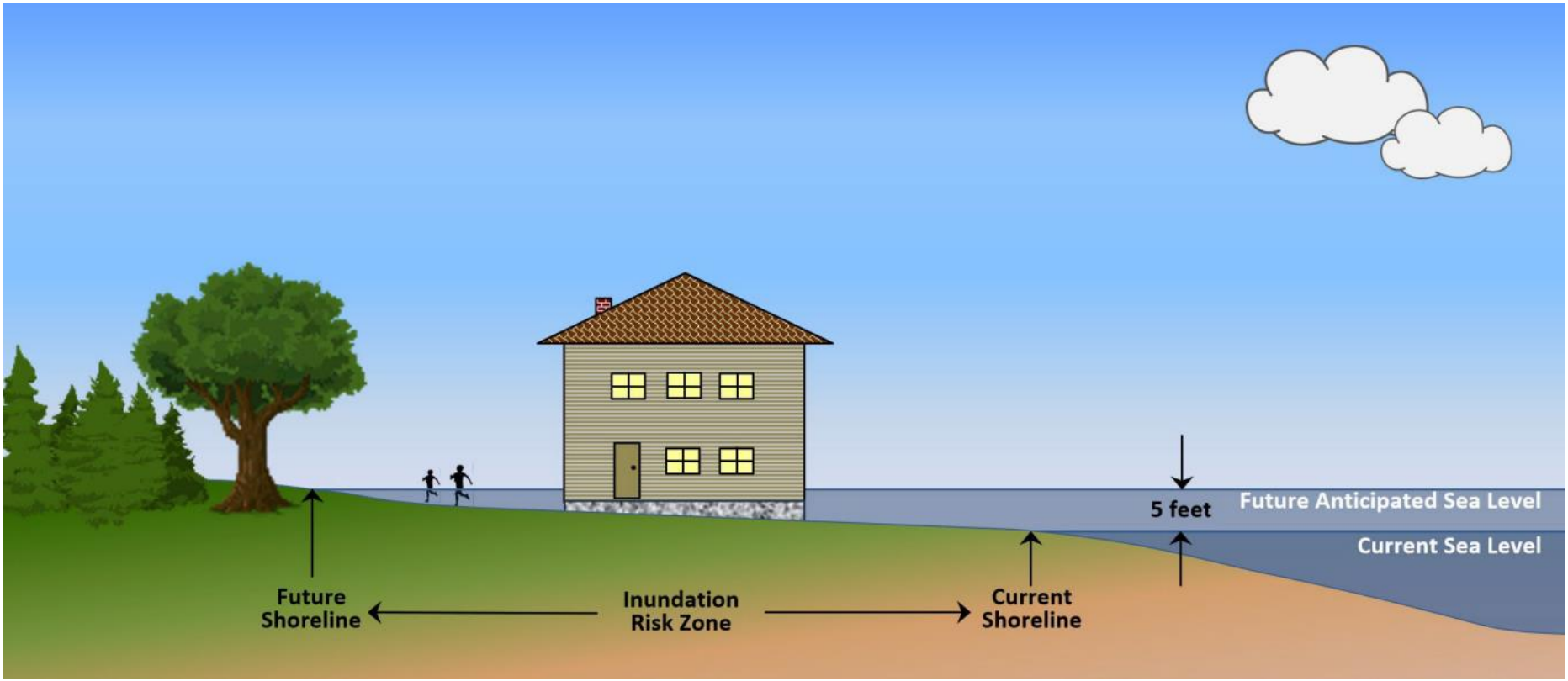
INUNDATION RISK ZONE (IRZ)

Refers to land that is above sea level today but in the future will be under permanent standing water all the time due to SLR or twice a day during high tides

Includes **all land that lies within 5 feet** vertically of the MHHW (mean higher high water) elevation

Standards for proposed new or improved buildings apply to:

- Residential buildings
- Critical buildings and infrastructure


5 feet
Future Anticipated Sea Level
Current Sea Level
Future
Shoreline
Inundation
Risk Zone
Current
Shoreline

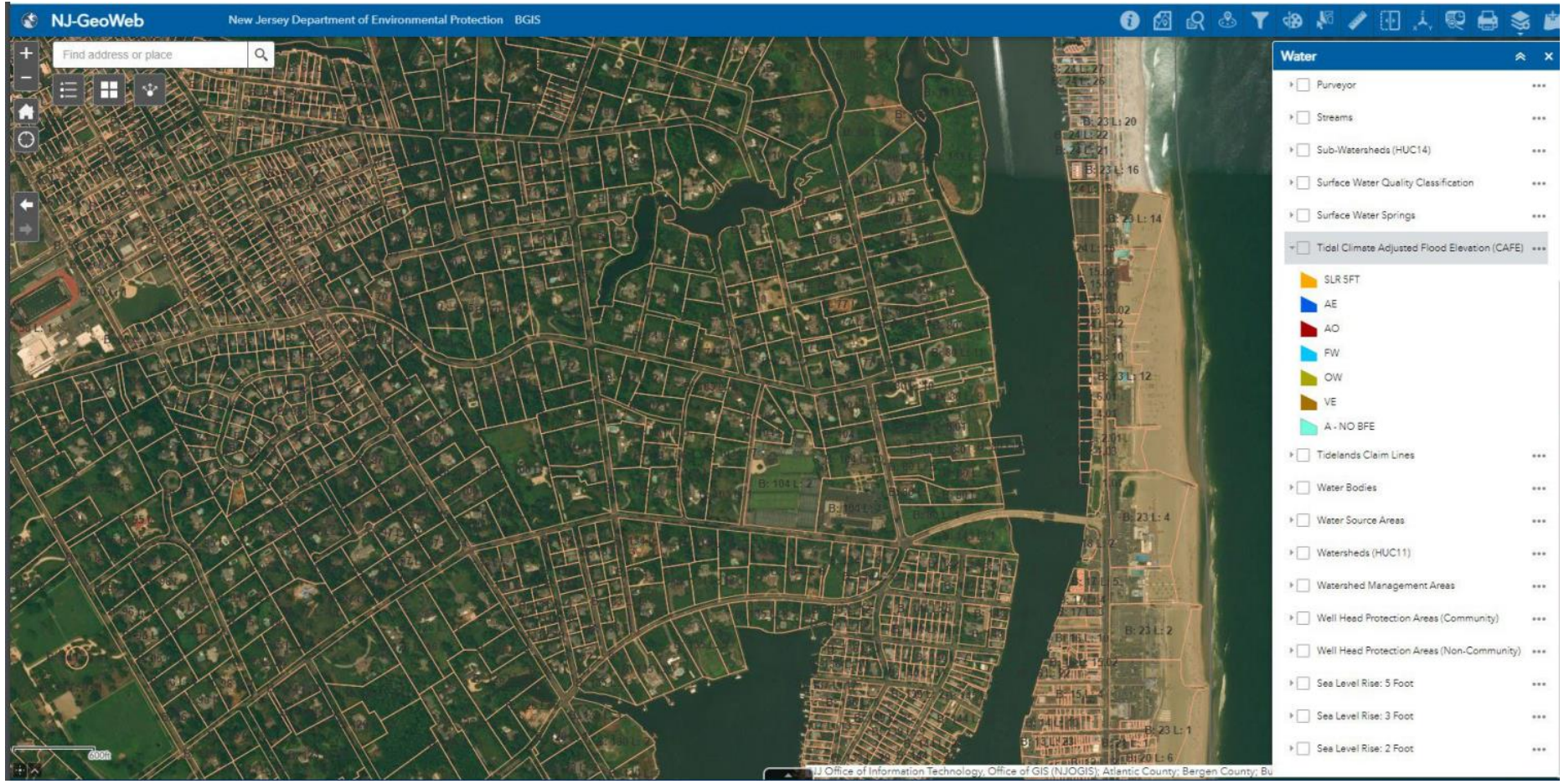
REQUIREMENTS

INUNDATION RISK ZONE (IRZ)

- Permanent standing water due to SLR
- Sites under an IRZ require:
  a. Inundation Risk Assessment: for notice purposes
  b. On - site alternative analysis
  c. Risk acknowledgement

COASTAL FLOOD HAZARD AREA

- Annual risk of storm-induced flooding exacerbated by SLR; this flooding retreats
- Site requirements
  a. No Inundation Risk Assessment
  b. No alternative analysis
  c. Shorter Risk acknowledgement


NJ-GeoWeb
New Jersey Department of Environmental Protection BGIS
Find address or place
Water
Purveyor
Streams
Sub-Watersheds (HUC14)
Surface Water Quality Classification
Surface Water Springs
Tidal Climate Adjusted Flood Elevation (CAFE)
SLR 5FT
AE
AO
FW
OW
VE
A - NO BFE
Tidelands Claim Lines
Water Bodies
Water Source Areas
Watersheds (HUC11)
Watershed Management Areas
Well Head Protection Areas (Community)
Well Head Protection Areas (Non-Community)
Sea Level Rise: 5 Foot
Sea Level Rise: 3 Foot
Sea Level Rise: 2 Foot
600ft
NJ Office of Information Technology, Office of GIS (NJOGIS); Atlantic County; Bergen County; Bu


NJ-GeoWeb
New Jersey Department of Environmental Protection BGIS
Find address or place
Water
Head of Tide (HOT)
National Hydrography Dataset (NHD) Streams 2015 for New Jersey
National Hydrography Dataset (NHD) Waterbody 2015 for New Jersey
Pinelands Area
Pinelands Protection Act 1979
Purveyor
Streams
Sub-Watersheds (HUC14)
Surface Water Quality Classification
Surface Water Springs
Tidal Climate Adjusted Flood Elevation (CAFE)
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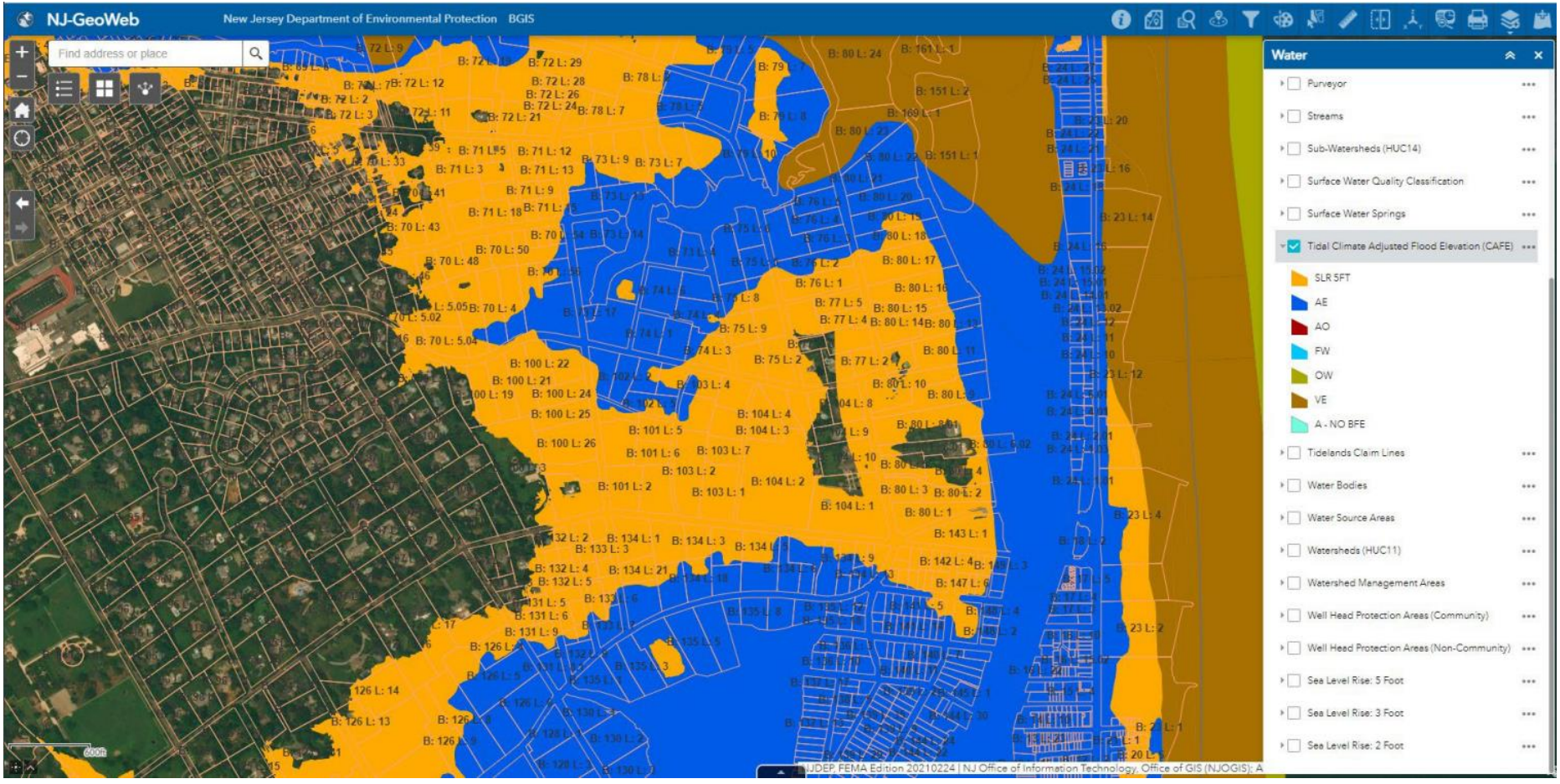
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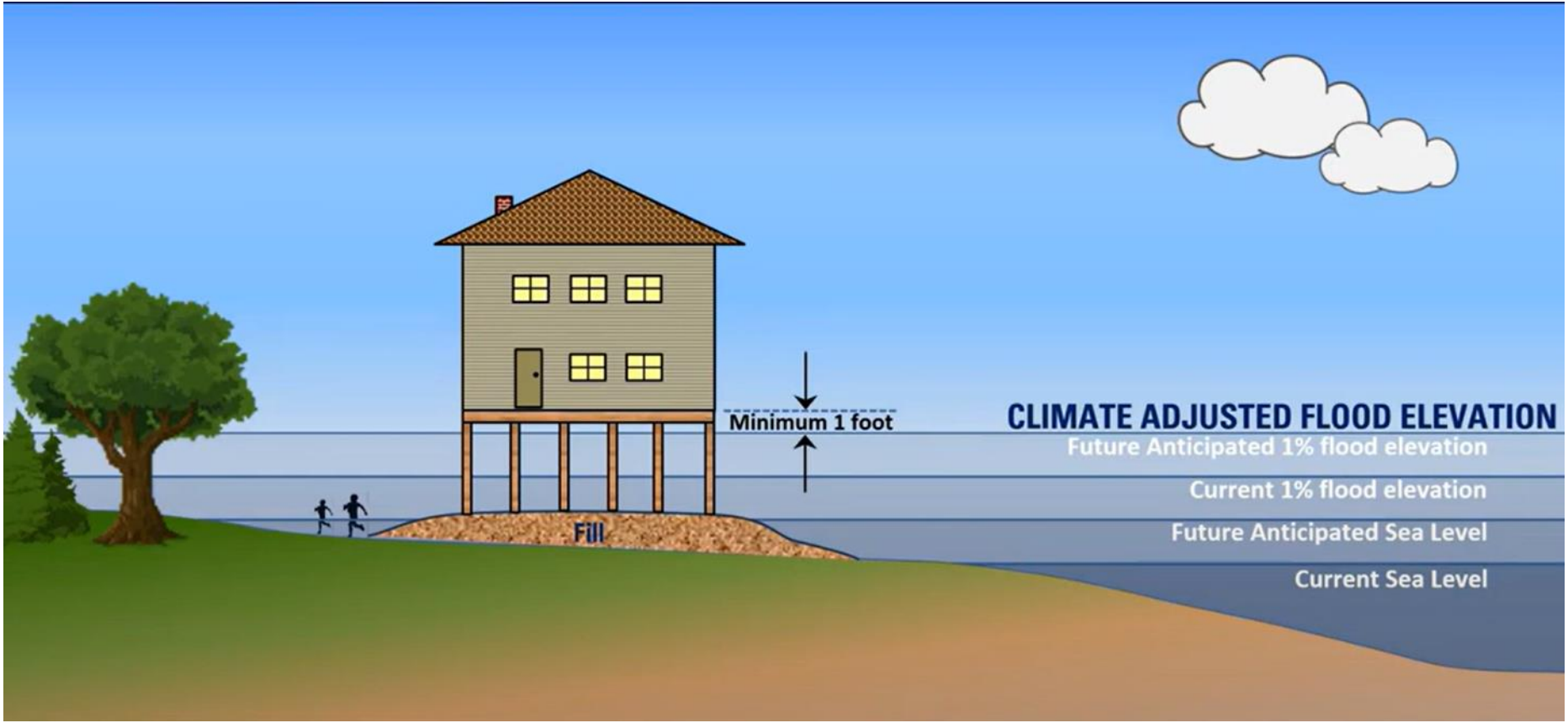
Sea Level Rise: 5 Foot
Sea Level Rise: 3 Foot
Sea Level Rise: 2 Foot
NJDEP, FEMA Edition 20210224 | NJ Office of Information Technology, Office of GIS (NJOGIS); A

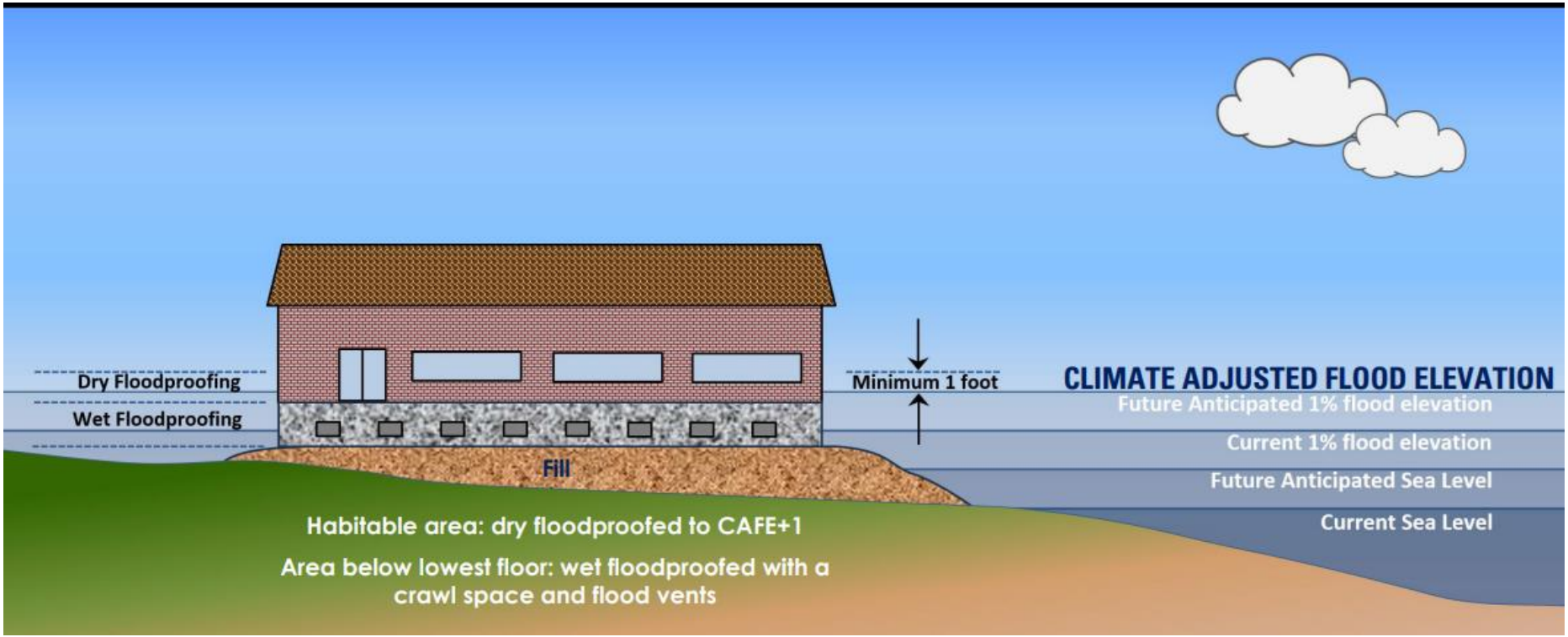
WHAT DOES THIS MEAN FOR BUILDINGS?

- **Residential**:
  - Floor surface must be at or above CAFE + 1’
- **Commercial/Industrial buildings**
  - Can be elevated or floodproofed or both, habitable areas must be dry proofed
  - Enclosed areas below lowest floor can be wet floodproofed
- **All buildings**
  - No perm enclosures below CAFE+1 in VE and Coastal AE zones
  - Habitable areas cant be wet floodproofed
  - Area beneath lowest floor only for parking, access and limited storage
- **Site- level**
  - Dry access: in certain circumstances, dry access required > atleast 1ft above CAFE to get to building

RESIDENTIAL BUILDING: SCENARIO



COMMERCIAL/INDUSTRIAL BUILDING: SCENARIO



Stormwater Green Infrastructure and You … it's something you can do!

Christopher R. Schmitt, LSRP, CHMM, ENV-SP
GZA GeoEnvironmental, Inc.

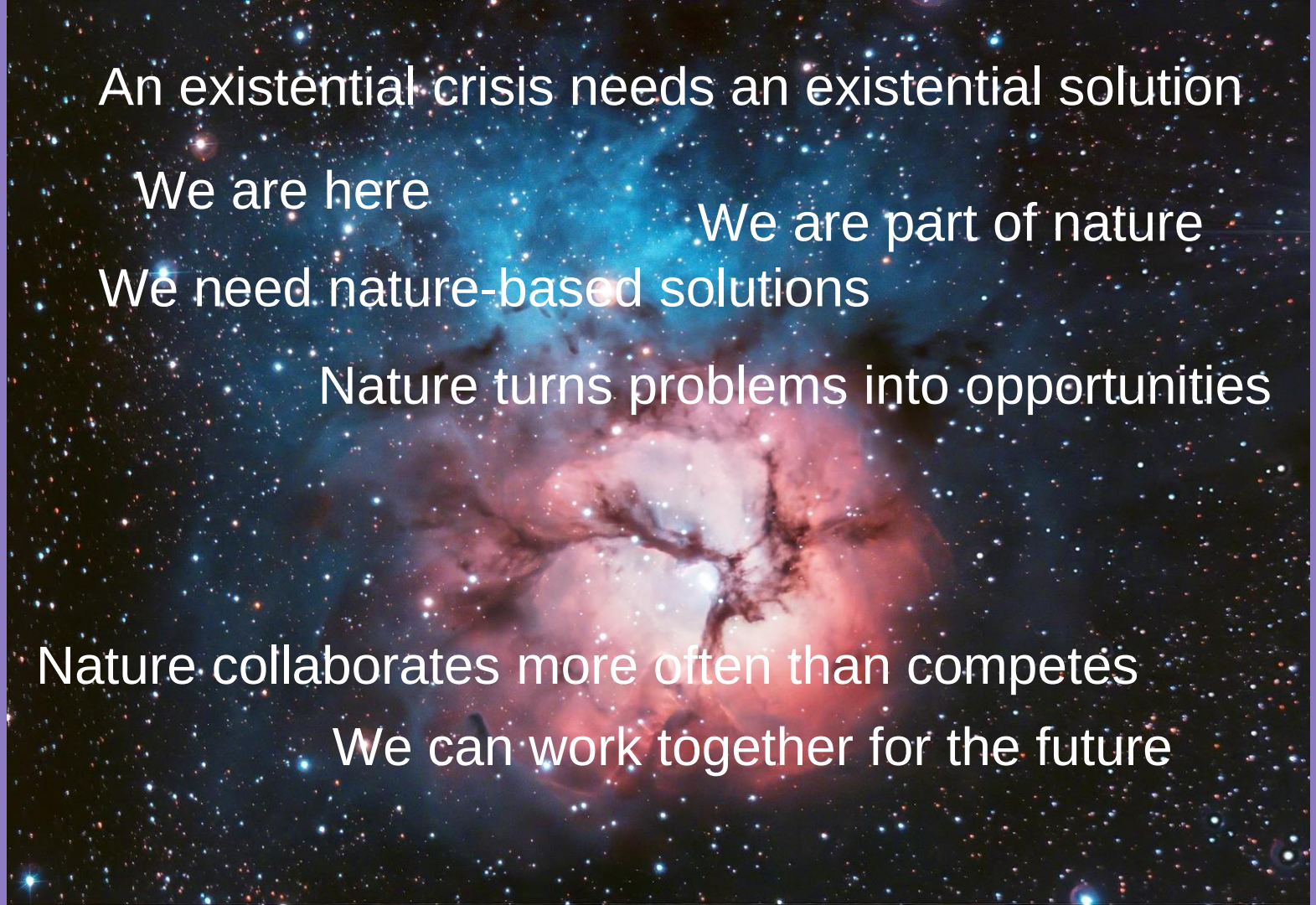
GZA 60 YEARS
CELEBRATING 60 YEARS OF EXCELLENCE

The reason for the ride

- Finding purpose
- No fear
- Family and the future

Farm Sweet Farm

- Original meaning of “farm” was “*strong, fixed agreement*”
- Regenerating for the future
- Purpose in work


An existential crisis needs an existential solution
We are here
We are part of nature
We need nature-based solutions
Nature turns problems into opportunities
Nature collaborates more often than competes
We can work together for the future

GZA 60 YEARS
CELEBRATING 60 YEARS OF EXCELLENCE

Senior Consultant–Sustainable Communities

- Building sustainable communities
- Connecting people and nature
- Collaborating with interdependence
- Regenerating for resilience

Zach and Chris at NJ SAME Coastal Resilience Conference


Sustainable Stormwater Management

Green Stormwater Infrastructure

Slow it, spread it, sink it, store it

…you can do it, too

Small Scale Residential

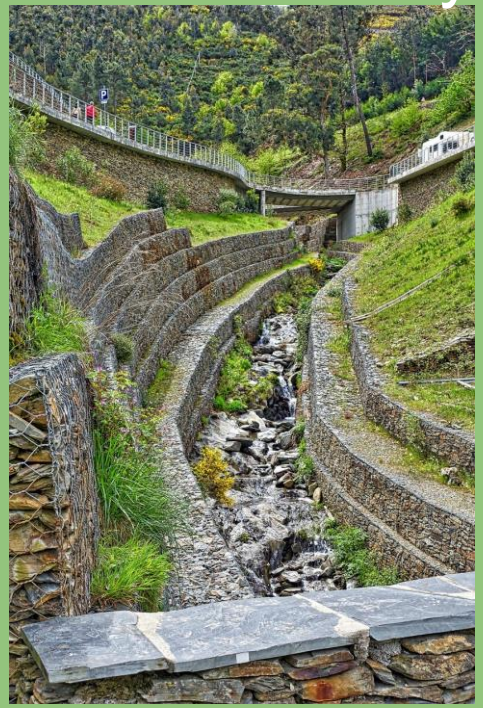
Green Stormwater Infrastructure

Slow it, spread it, sink it, store it

…you can do it, too

Large Scale Commercial and Municipal

Library rain garden



Terraced streambed

Drought-tolerant landscaping

Green Stormwater Infrastructure

Slow it, spread it, sink it, store it

…you can do it, too

NJ REAL - What is Required?

Maximum of 3% Impervious Cover will be allowed in critical environmental zones

- CAFRA “Critical Environmental Site” added to NJ REAL rules.
- Protects sensitive shorelines and natural systems from development.
- Applies to properties In the Inundation Risk Zone (IRZ), where the risk of flooding is either regular or permanent.
- Applies to New Development, Redevelopment and Substantial Improvements to buildings.
- Encourages nature-based solutions for building protections at shorelines.

Green Stormwater Infrastructure

Slow it, spread it, sink it, store it

…you can do it, too

NJ REAL - What is Required?
Maximum of 3% Impervious Cover will be allowed in IRZ

Why is this necessary?

- Marshes trap sediments from tidal waters, allowing them to grow in elevation as sea level rises.
- Marshes provide a natural barrier to waves: 15 feet of marsh can absorb 50% of a wave's energy.
- Living shorelines are more resilient against storms than hardened bulkheads, which can create seaward erosion.

Green Stormwater Infrastructure

Slow it, spread it, sink it, store it

…you can do it, too

NJ REAL - What is Required?
Water Quality Treatment for Redevelopment Projects

- Water quality treatment will be required for the redevelopment of existing vehicle areas (parking lots).
- Green infrastructure (pervious paving, bioswales, rain gardens) are required.
- GI systems must have a Total Suspended Solids (TSS) removal rate of 80%.
- Manufactured Treatment Devices (MTDs) *may* be used by variance/waiver.
- MTDs are stormwater treatment systems which reduce water quality impacts.
- MTDs remove pollutants from stormwater by sedimentation or filtration.

Green Stormwater Infrastructure

Slow it, spread it, sink it, store it

…you can do it, too

NJ REAL - What is Required?
Water Quality Treatment for Redevelopment Projects

Why is this necessary?

- GI manages stormwater close to its source either by infiltration into subsoil, treatment by vegetation or soil or storage for reuse.
- GI MTDs often use a filter media to remove stormwater pollutants, allowing for a smaller footprint than conventional bioretention systems.
- Some GI MTDs incorporate vegetation within the unit to form a plant/soil/microbe complex for the purpose of pollutant removal.

Green Stormwater Infrastructure

Slow it, spread it, sink it, store it

…you can do it, too

NJ REAL - What is Required?
Total Maximum Daily Limit (TMDL)

- A TMDL is the calculation of the max amount of a pollutant allowed in a waterbody so that the waterbody will meet water quality standards.
- A TMDL Implementation Plan is developed to identify the measures needed to reduce pollutants so that surface water quality standards are met.
- Registration of development activities under a new “permit-by-certification” process will allow tracking of cumulative impacts on a watershed-wide basis, and analyze permit use to allow for adjusted standards to impaired waters and TMDLs.

Green Stormwater Infrastructure

Slow it, spread it, sink it, store it

…you can do it, too

NJ REAL - What is Required?
Total Maximum Daily Limit (TMDL)

Why is this necessary?

- Compliance with TMDLs will result in improved water quality, particularly in urban areas, and will proactively prevent degradation of water quality in less developed areas.
- Major developments located in a watershed that has a TMDL must incorporate additional measures to address TMDL, such as stormwater Best Management Practices and GI.

Green Stormwater Infrastructure

Slow it, spread it, sink it, store it

…you can do it, too

NJ REAL benefits community:

- More resilient properties
- Higher property values and resale values
- Lower maintenance costs
- Lower property insurance
- Increased ability to manage risks
- Reliable infrastructure to sustain lifestyles
- Legacy for future generations

Special thanks to my family at
The Philosophy Family Farm LLC

Christopher R. Schmitt, LSRP, CHMM, ENV-SP
Senior Consultant–Sustainable Communities
201-463-4267
christopher.schmitt@gza.com

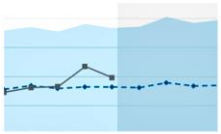
Fall morning on the farm

Overview of NJ Adapt

Link - https://njclimateresourcecenter.rutgers.edu/nj-adapt/

NJ Adapt is a suite of tools developed by Rutgers University for climate adaptation planning in New Jersey to assist planners, community leaders, businesses, and residents to understand and adapt to the impacts of climate change on people, assets, and communities in New Jersey.

Tools within NJ



Climate Dashboard

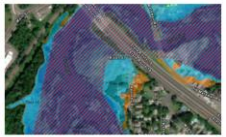
New Jersey climate trends in moderate and high emissions scenarios

Climate Planning Tool

A guide to using coastal flooding data in climate change planning

Climate Snapshots

Climate risks summarized by municipality, county and statewide

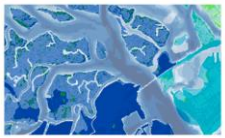


Local Planning Navigator

A decision-support tool for building community resilience

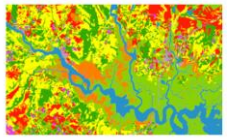
NJ ResTOrS

New Jersey Restoration Tool Organization Suite (NJResTOrS)



NJ FloodMapper

An interactive flood exposure data mapping tool

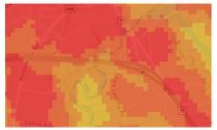


NJ Forest Adapt

A data mapping tool for forest management

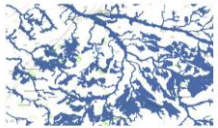
NJ HazAdapt

Data and resources for hazard mitigation planning



NJ Public Health Adapt

Climate planning for improved health outcomes



Rutgers Inland Design Flood Elevation

FEMA 1% Chance Annual Flood +3 feet

Disclaimer

- The data, maps, and information provided should be used only as a screening-level tool. As with all remotely sensed data, all features should be verified with a site visit.
- These tools should be used strictly for planning reference - and not for navigation, permitting, or other legal purposes.

Some Identified Funding Sources

Specific to Nature-Based Solutions:

- Tapping the Potential of (and Funding for) Nature-Based Solutions - National League of Cities (nlc.org)

FEMA:

- FEMA Hazard Mitigation Assistance (HMA) Programs | FEMA.gov
- FEMA Hazard Mitigation Assistance Program and Policy Guide

Summary guide across many federal sources:

- REPI Resilience Guide

https://www.repi.mil/Portals/44/2024_REPI_Resilience_Guide_052024.pdf

Opportunities for CRS Credit

- The current floodplain will have 4 feet of additional freeboard and we will go from 16% of the state's land area being in the floodplain to 17.5%.
- It remains to be seen how CRS will reward the extension of the floodplain, but the freeboard requirement would be in play for freeboard credit
- This could result in increases in points under Activity 420 (Higher Regulatory Standards) Element FRM (Freeboard) for CRS communities. These points would likely be realized under the CRS Uniform Minimum Credit for state requirements.
- The CRS manual states that if more than 3 feet of freeboard is used, then the regulations will be reviewed for potential additional credit.

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Pritpal Bamrah, AICP, Senior Research Specialist, Rutgers University, pritpal.bamhrah@ejb.rutgers.edu

Caleb Stratton, AICP, PP, CFM, Assistant Business Administrator & Chief Resiliency Officer, cstratton@hobokennj.gov