N.J. Coastal & Climate Resilience Conference

Climate Resilience in NJ: State of the Science-State of the Practice

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NJ CRC COASTAL RESILIENCE COLLABORATIVE

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

N.J. Coastal & Climate Resilience Conference

What the Hell Just Happened ?

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NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

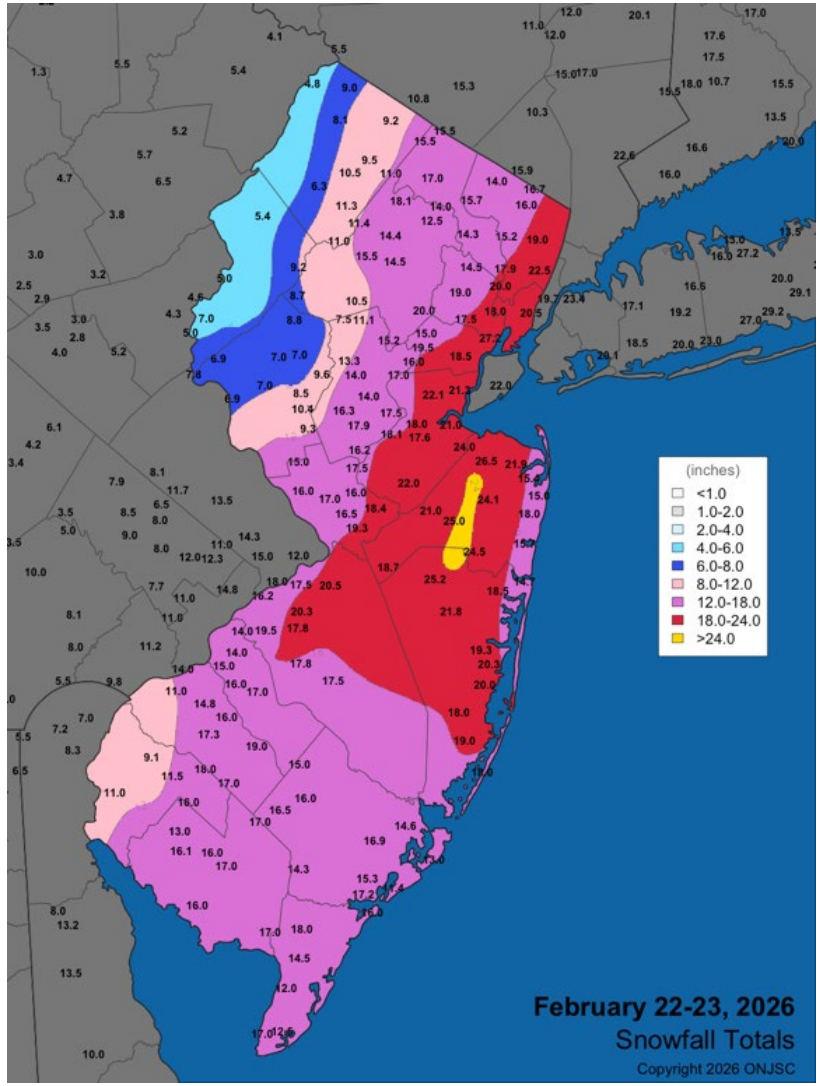
RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

Recent NJ Weather/Climate Events Tell a Story

2026 New Jersey Coastal and Climate Resilience Conference

Dr. David A. Robinson
Distinguished Professor, Department of Geography
& New Jersey State Climatologist
Rutgers University

March 9, 2026



Snowfall: February 22-23, 2026

Office of the NJ State Climatologist

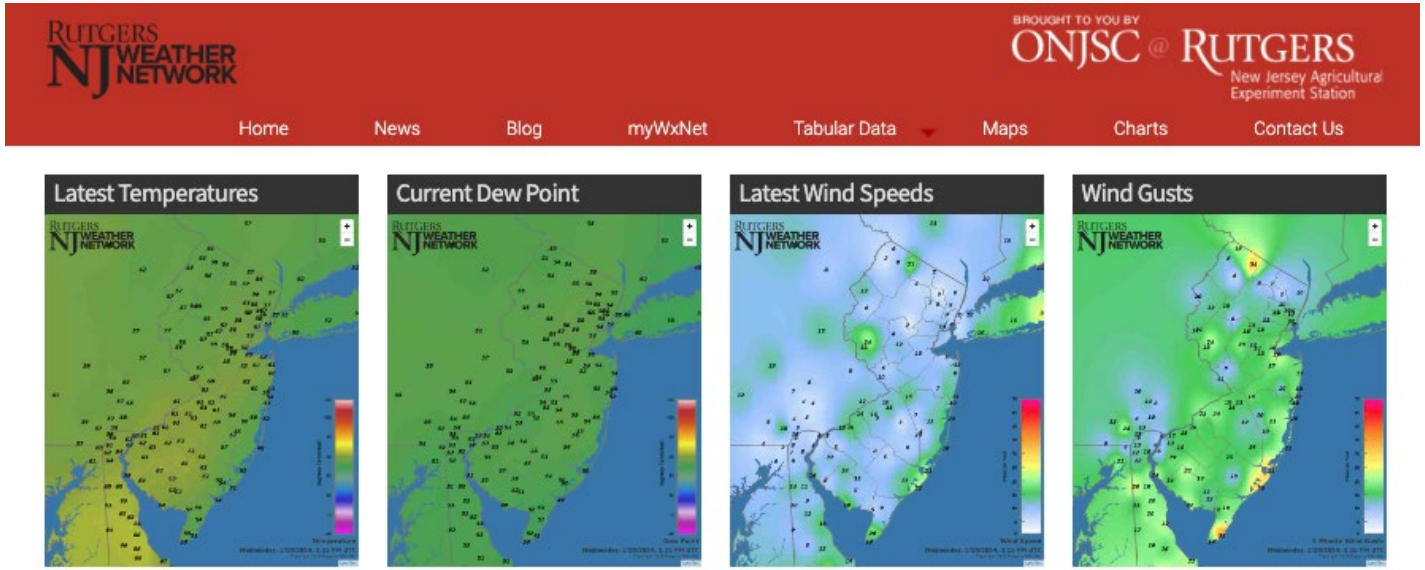
Helping decision makers

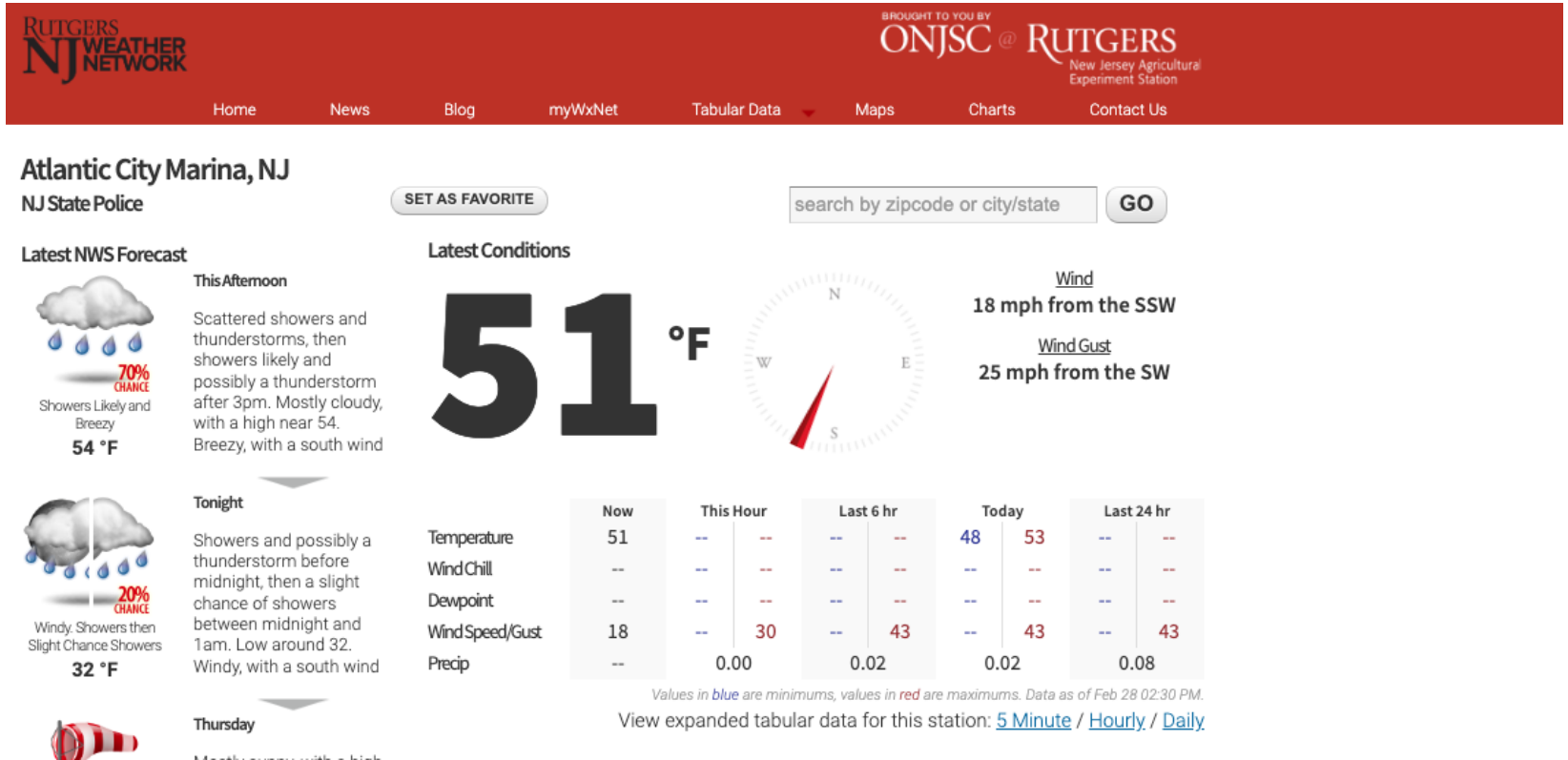
Locals trusting locals

njclimate.org

Rutgers New Jersey Weather Network

njweather.org

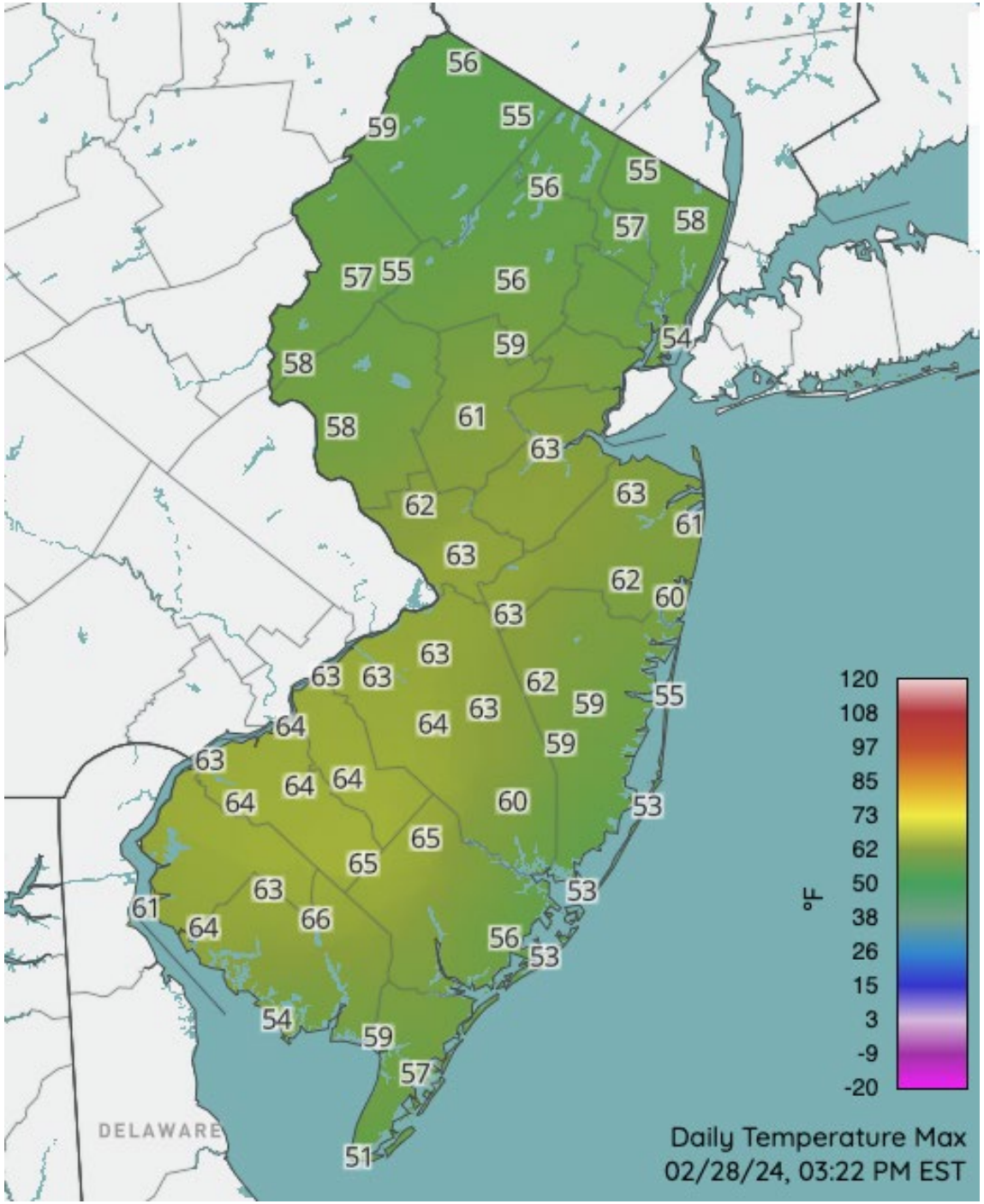




NJWxNet stations
(not all shown here)

Observations:
Hourly since the 1990s
Five minute since 2012

Network has grown to the current 70 stations



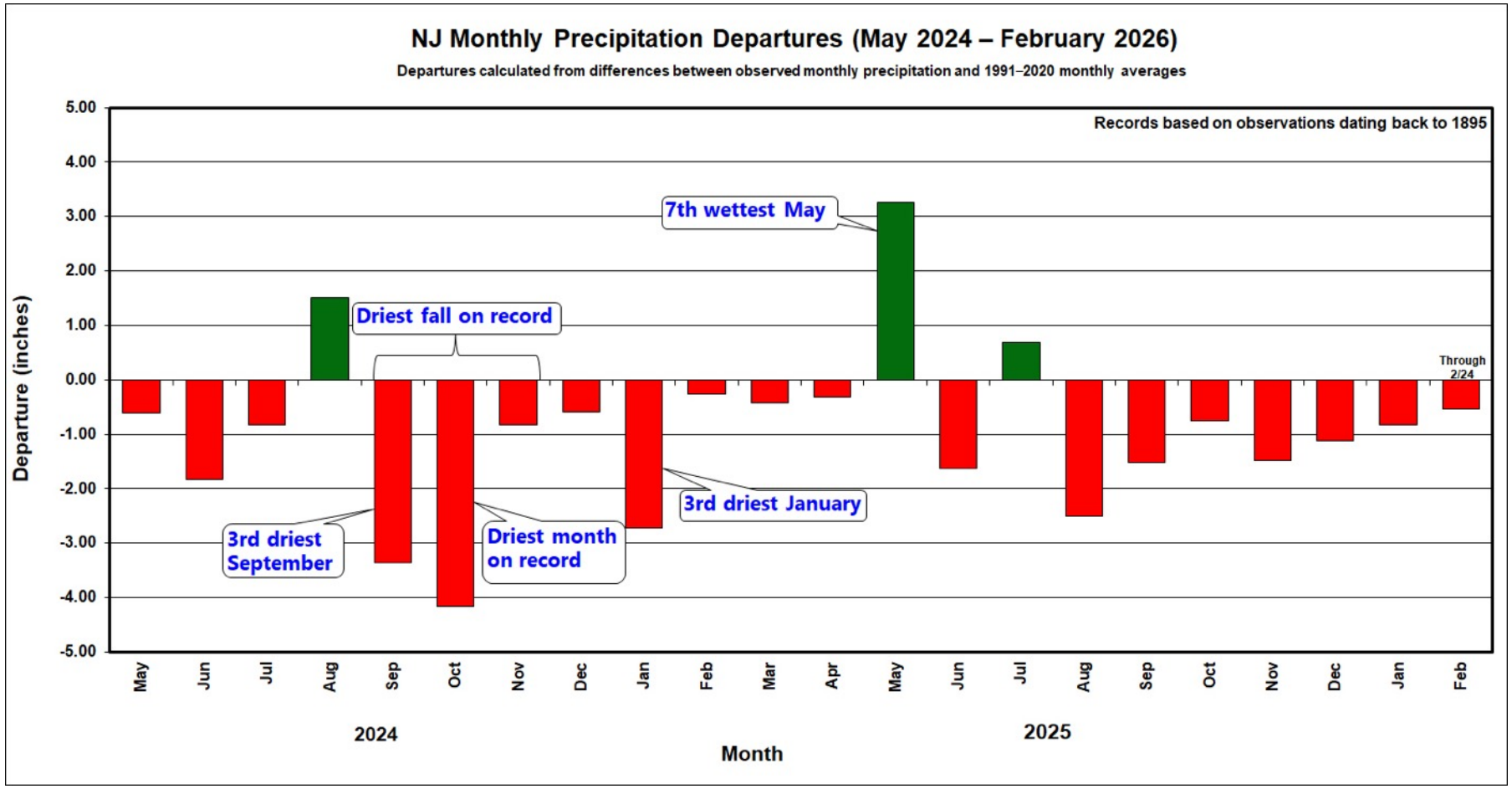
Community Collaborative Rain, Hail and Snow Network (CoCoRaHS)

Daily observations by over 300 trained volunteers

https://cocorahs.org

Drought

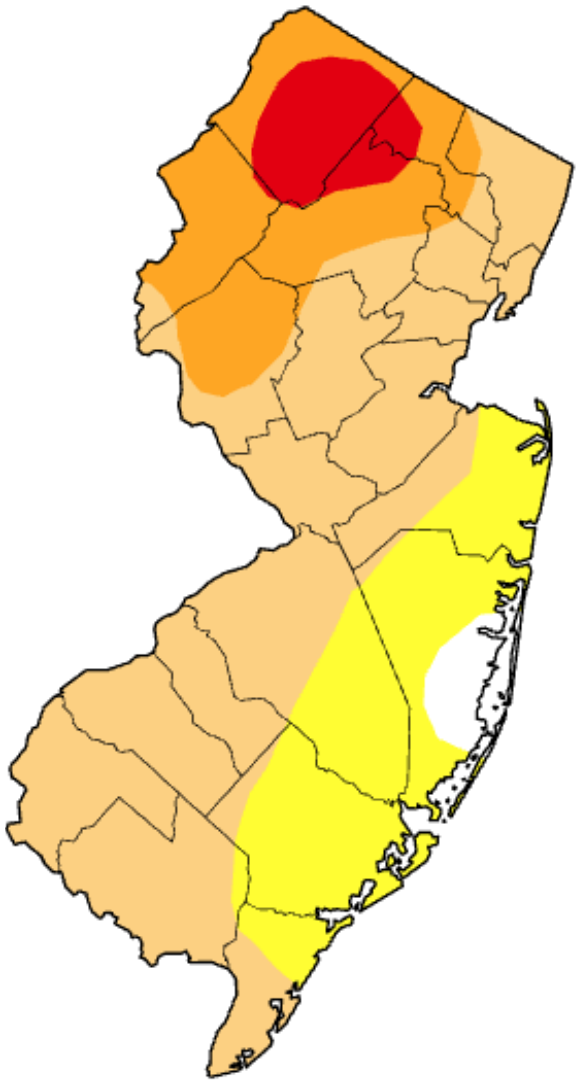
NJ monthly precipitation departures for the past 22 months



Top 10 months annotated

Office of the NJ State Climatologist, Rutgers University

US National Drought Monitor



Map released: Thurs. March 5, 2026

Data valid: March 3, 2026 at 7 a.m. EST

Intensity

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

NJDEP drought information

NEW JERSEY
Regional Drinking-Water-Supply Indicators & Declared Water-Supply Status

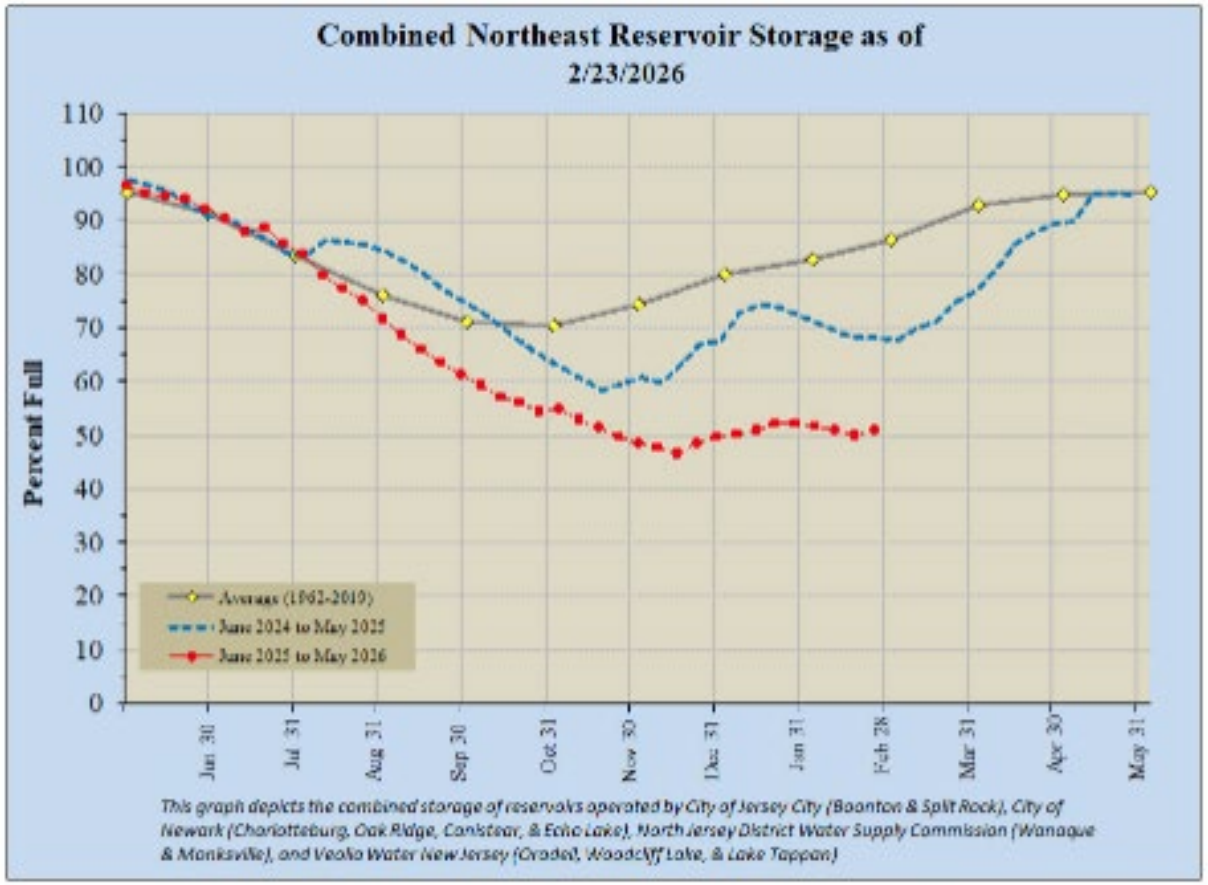
February 22, 2026

Region	Drinking-Water-Supply Indicator: Status	90-day precip-itation	90-day stream-flow	N.J. reser-voirs	Del. R. reser-voirs	Uncons ground water	Water-Supply Status	
North-west	Near or above normal			Not a significant region-wide water resource.	●		Normal	
	Moderately dry					0	Watch	
	Severely dry	16					Warning	12
	Extremely dry		12				Emergency	
Central	Near or above normal				●		Normal	
	Moderately dry						Watch	
	Severely dry	16		3		26	Warning	12
	Extremely dry		15				Emergency	
North-east	Near or above normal				Not a significant region-wide water resource.		Normal	
	Moderately dry						Watch	
	Severely dry	6		17			Warning	12
	Extremely dry		5			5	Emergency	
South-west	Near or above normal			Not a significant region-wide water resource.	●		Normal	
	Moderately dry						Watch	
	Severely dry		0				Warning	12
	Extremely dry	1				5	Emergency	
Coastal North	Near or above normal			24	Not a significant region-wide water resource.		Normal	
	Moderately dry					0	Watch	
	Severely dry	4	20				Warning	12
	Extremely dry						Emergency	
Coastal South	Near or above normal			Not a significant region-wide water resource.	Not a significant region-wide water resource.		Normal	
	Moderately dry						Watch	
	Severely dry	8					Warning	12
	Extremely dry		19			14	Emergency	

Low Flow…

Great Falls, Paterson: June 25, 2025
(D. Robinson)

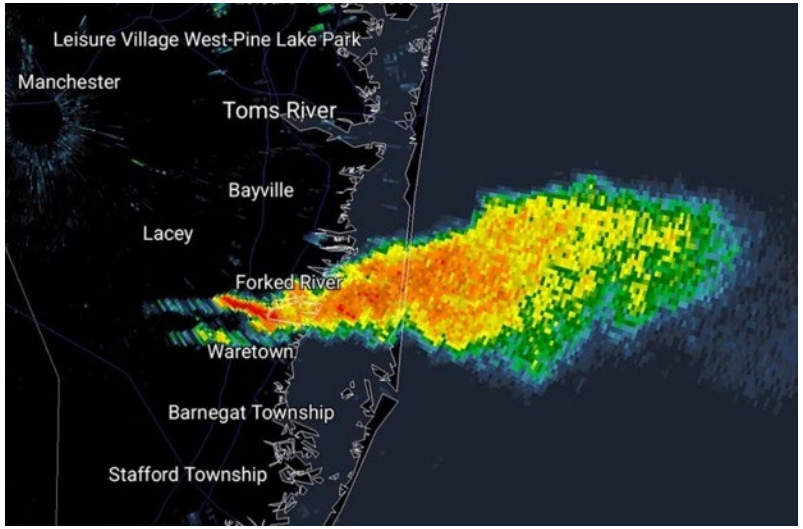
Low Storage…



NJ Dept. Environmental Protection: February 23, 2026

Wildfire

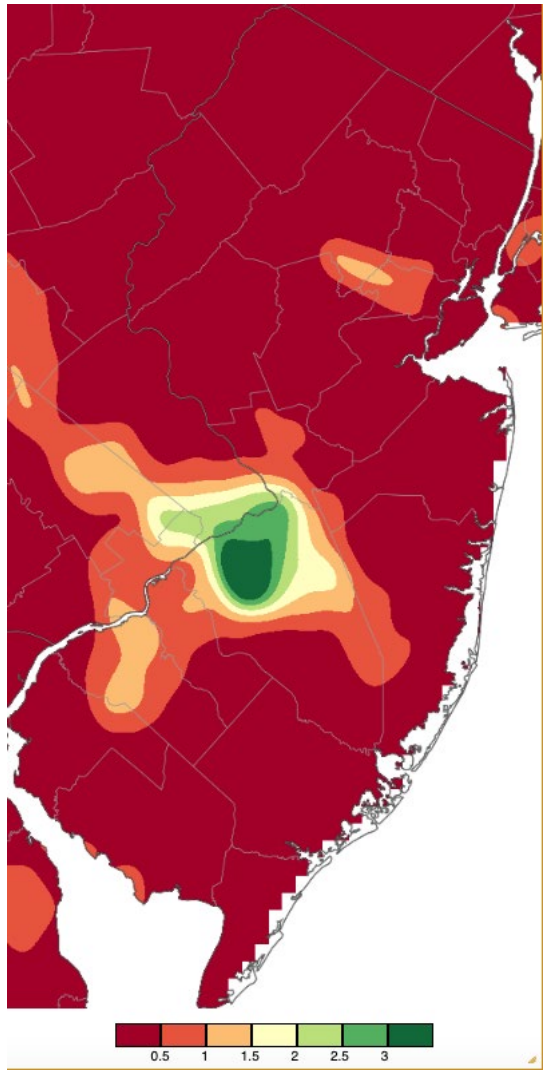
Tea Time Hill Fire: July 24, 2024



Jones Road Fire: April 22, 2025

NJ Forest Fire Service
National Weather Service

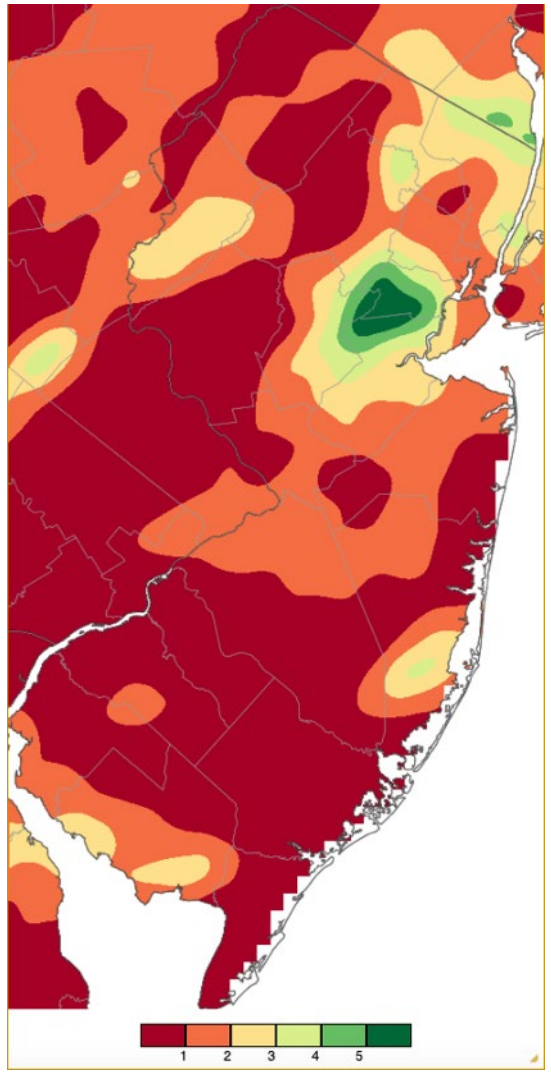
Local Deluges: when it rains, it pours….



August 17, 2025

Greenwood Lake (Hewitt): June 7, 2024
(Rich Stewart)

Plainfield: July 15, 2025
(Seth Wenig)



July 14, 2025

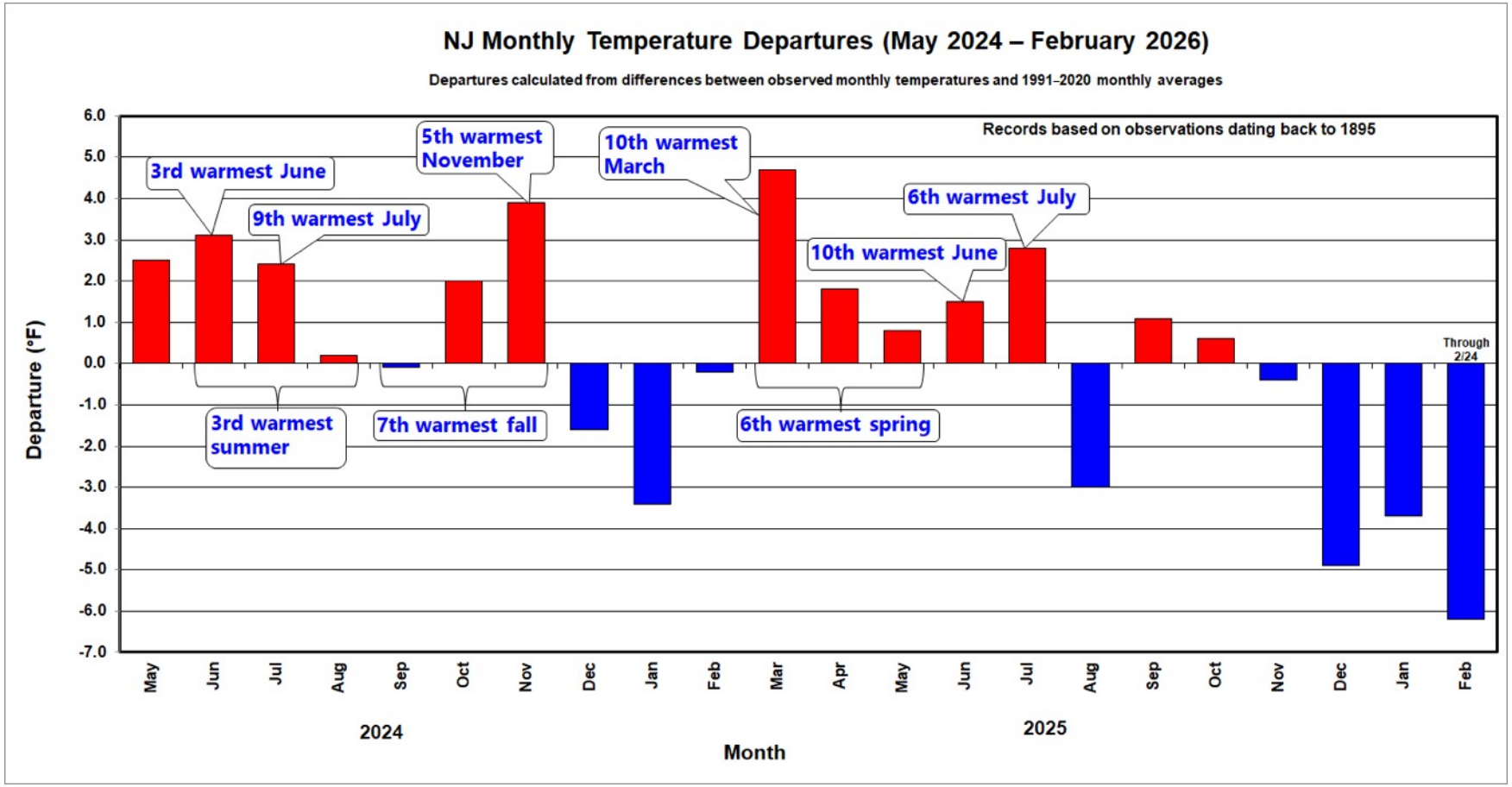
Coastal Storms

Hurricane Erin: Beach Haven: August 23, 2025
(Colleen Lambert)

Stalled Nor’easter: North Wildwood: October 12, 2025
(Greg Graham)

Winter Cold & Snow

NJ monthly temperature departures for the past 22* months



Top 10 months annotated

Office of the NJ State Climatologist, Rutgers University

Ice boating on the Navesink: February 1, 2026
(Brian Donohue)

Clark creature: December 14, 2025
(Dan Zarrow)

Global Connections

Smokey Paterson: June 7, 2023
(Steve Hockstein)

Where does NJ currently stand and what does the future hold for New Jersey's weather and climate?

- Rising temperatures
- Steady or increasing precipitation
- Increasing variability and extremes
  - storms, flood, drought, heat…….
- Rising sea level

Drought Busting:

Please, not too much too quickly

Thank you

Dave Robinson
david.robinson@rutgers.edu

https://njclimate.org

Pompton River: Wayne: December 19, 2023
(Julian Leshay)

N.J. Coastal & Climate Resilience Conference

Sea Level Rise and Coastal Storms

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COASTAL
RESILIENCE
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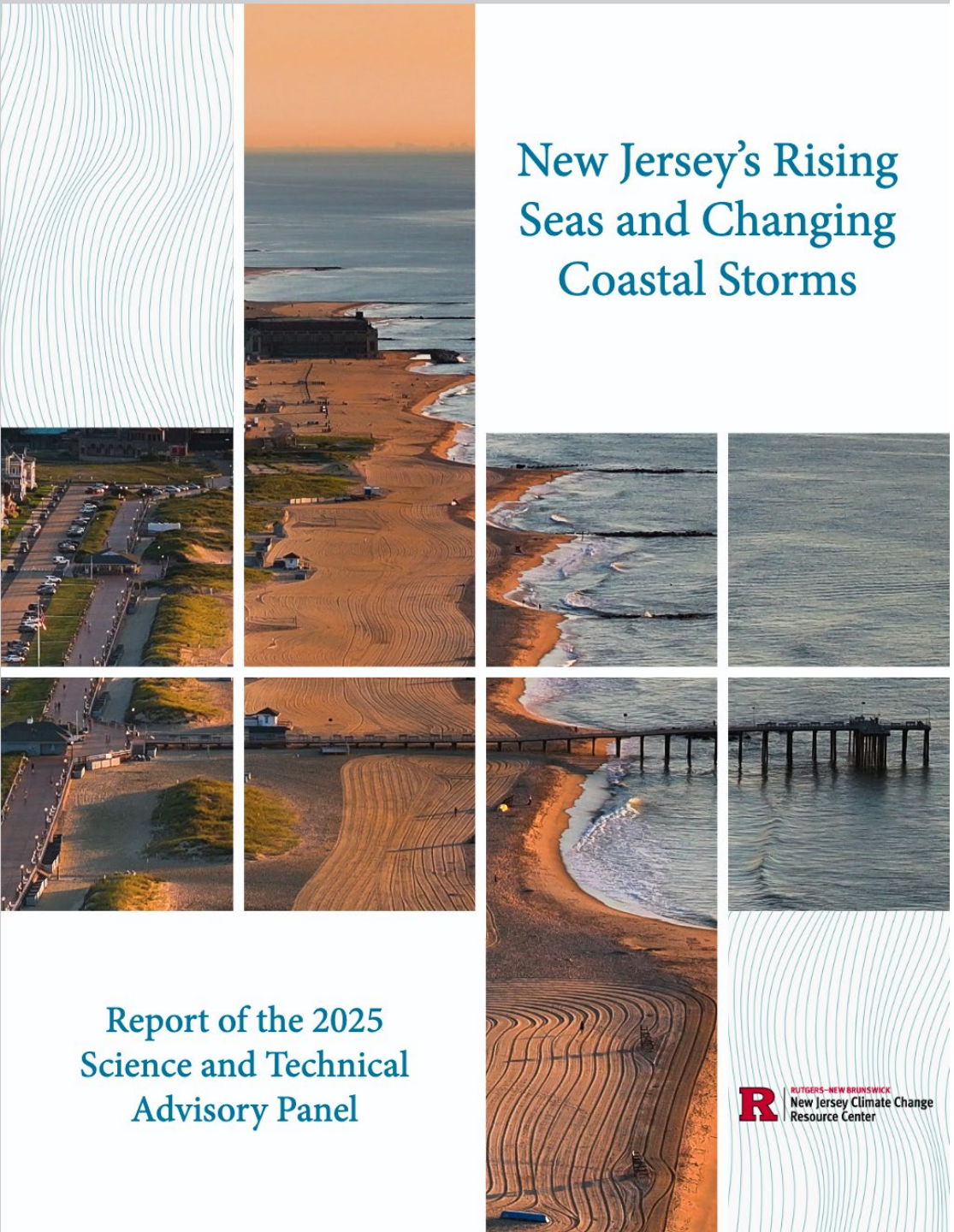
NEW JERSEY
DEPARTMENT OF
ENVIRONMENTAL
PROTECTION

New Jersey's Rising Seas and Changing Coastal Storms An Overview of the 2025 NJ STAP Report

March 9, 2026

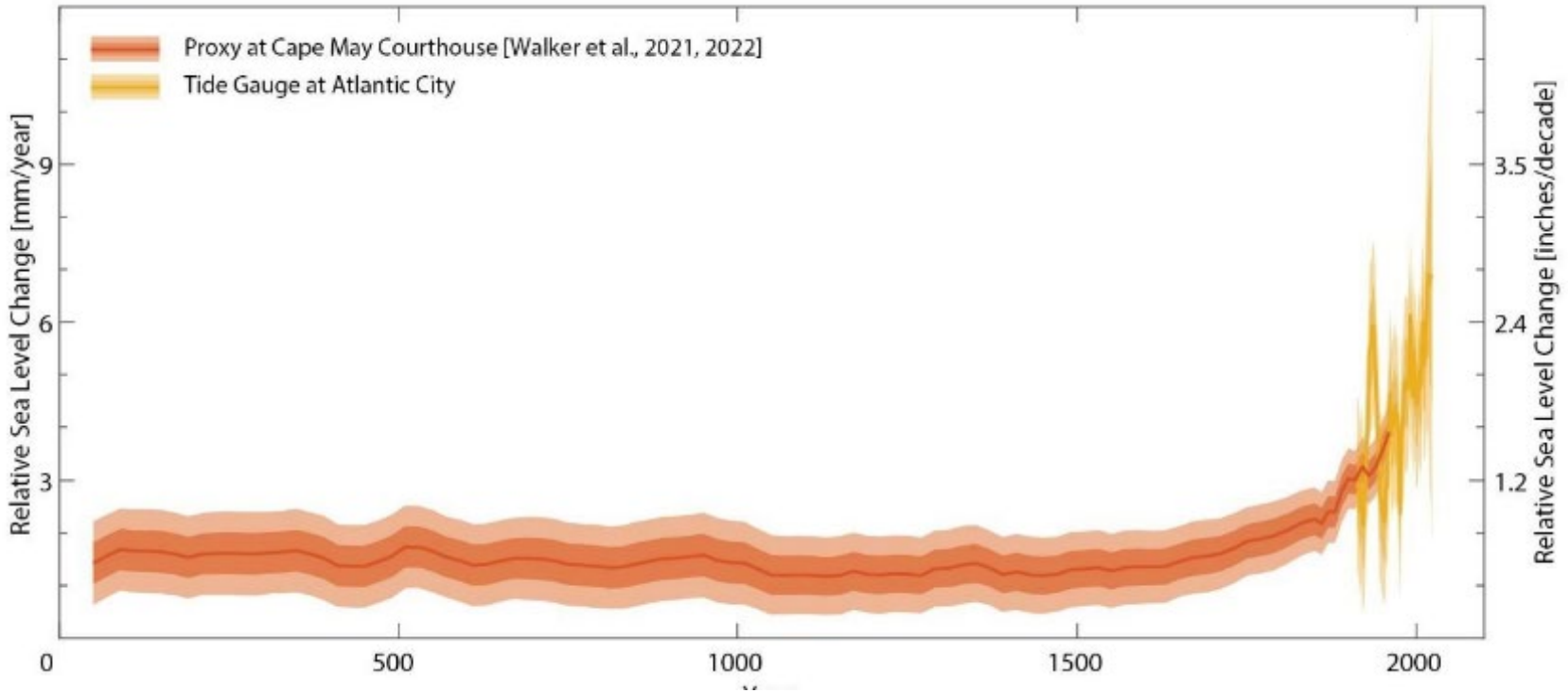
RUTGERS–NEW BRUNSWICK
New Jersey Climate Change Resource Center

Dr. Robert Kopp
Distinguished Professor of Earth & Planetary Sciences
Rutgers University



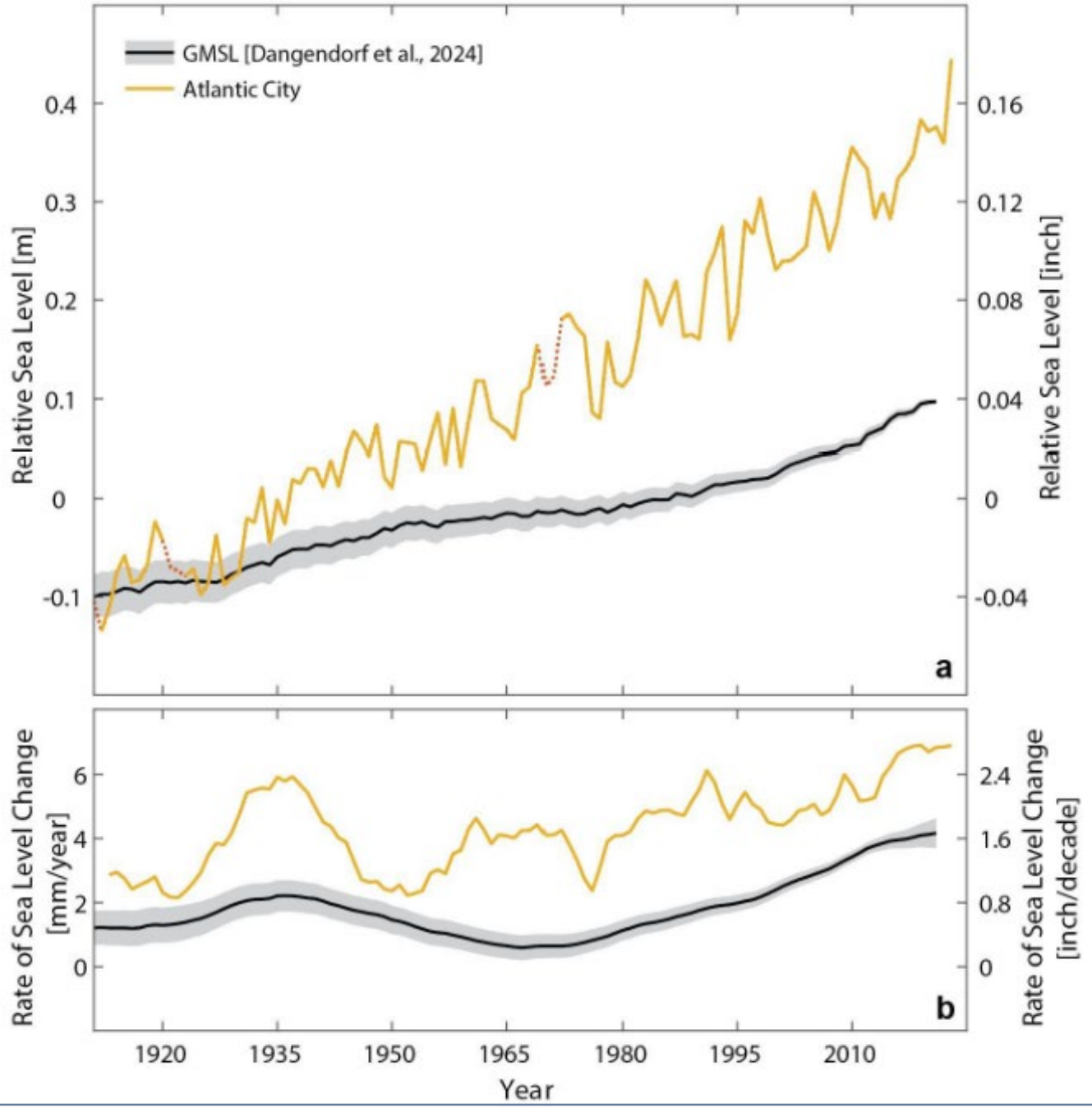
- **Science and Technical Advisory Panel (STAP) Members**
  - Dr. Robert Kopp, Dr. Anthony Broccoli, Glen Carleton, Dr. Sönke Dangendorf, Dr. Rob DeConto, Dr. Ryan Frederiks, Dr. Andra J. Garner, Emily Grover-Kopec, Dr. LeeAnn Haaf, Dr. Benjamin Hamlington, Dr. Ning Lin, Dr. Jorge Lorenzo-Trueba, Dr. Jon Miller, Dr. David Robinson, Dr. Gabriel Vecchi, Dr. Thomas Wahl, Dr. Jennifer Walker
- **Review Editors**
  - Dr. Donald F. Boesch, Dr. William Hallman
- **Reviewers**
  - Dr. Richard Lathrop, Dr. Kenneth Miller, Dr. William Veatch
- **Practitioner Panel Members**
  - Coastal planners, coastal restoration, developers, emergency management specialists, engineering firms, industry specialists, local governments, non-profits and more.
- **Science and Managing Support Team**
  - Janine Barr, Dr. James Shope, Diana K. Apoznanski, Dr. Praveen Kumar, Lucas Marxen, Ashlyn Spector, Dr. Karen O'Neill, Lisa Auermuller, Dr. Marjorie Kaplan
- **Funders**
  - NJDEP and the New Jersey Climate Change Resource Center

Sea-level rise is accelerating in New Jersey and globally



Based on geological data, over the two thousand years prior to the late nineteenth century, in New Jersey sea-level rose at an average rate of about 0.5 ± 0.1 inches/decade (1.4 ± 0.2 mm/yr). This rate is due to post-glacial subsidence. Over this time period, the global-mean sea level change was minimal.

Rates of sea-level rise in New Jersey, and globally, exceed pre-industrial variability beginning in the late nineteenth century.

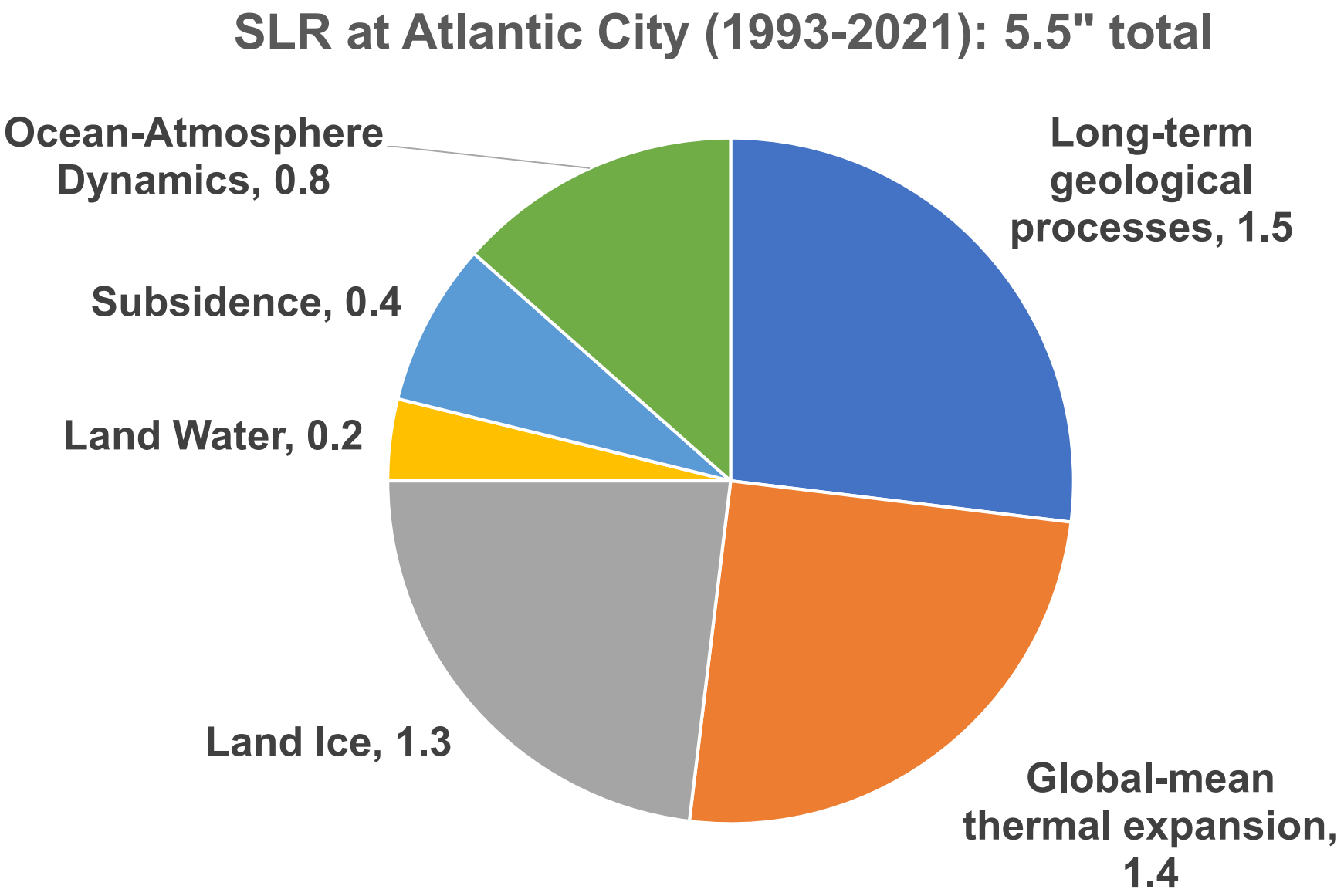


Sea-level rise is accelerating in New Jersey and globally

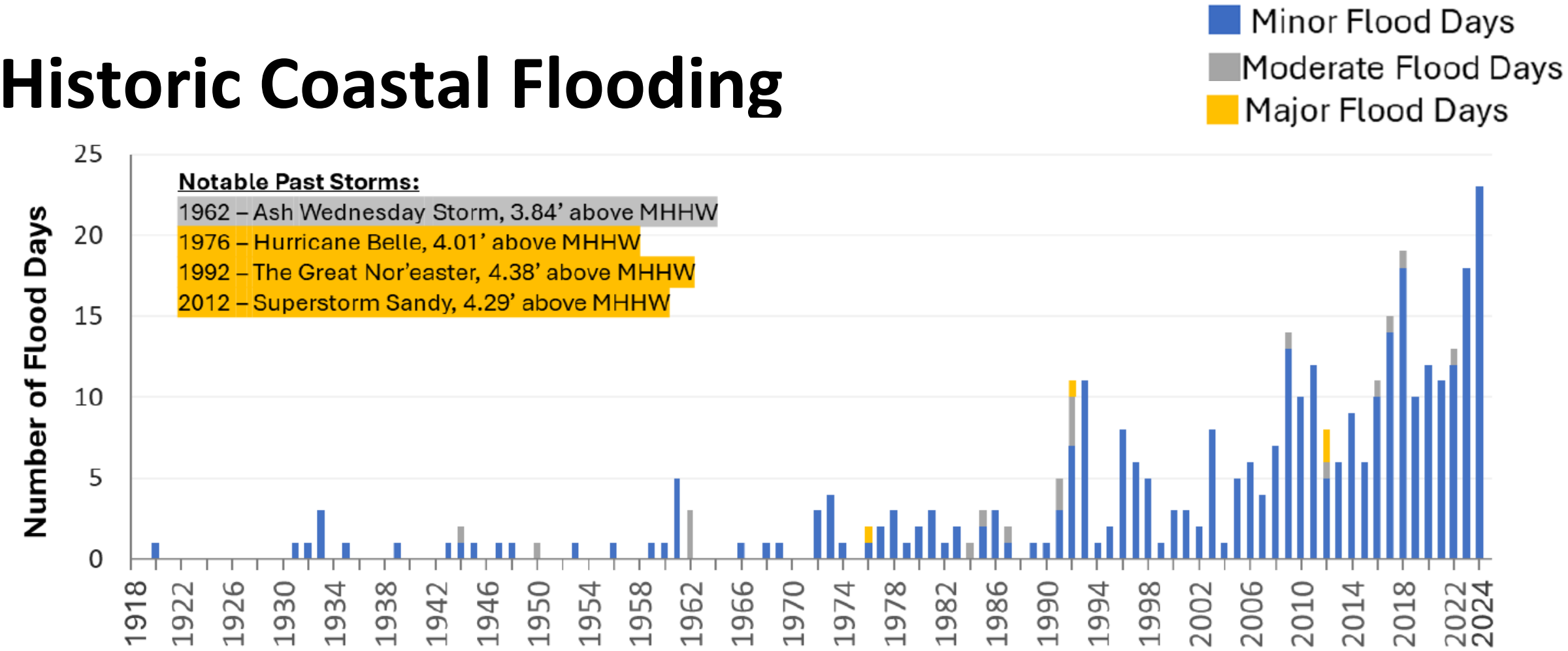
From 1912 to 2021, sea-level rose 1.7 ± 0.1 inches/decade (4.2 ± 0.2 mm/yr) at the Atlantic City tide-gauge, compared to a global-mean sea-level rise of 0.6 ± 0.1 inches/decade (1.5 ± 0.2 mm/yr).

From 1970–2021, sea-level rose 1.9 ± 0.2 inches/decade (4.9 ± 0.6 mm/yr) along the New Jersey coast, compared to a global-mean rise of 0.9 ± 0.2 inches/decade (2.2 ± 0.5 mm/yr).

Sea-level rise is accelerating in New Jersey and globally



Historic Coastal Flooding



- The total number of New Jersey coastal flood days has increased in frequency and magnitude ov result of sea level rise.
  - In the 1950s, Atlantic City experienced an average of less than one coastal flood day per year.
  - Over 2007–2024, there were an average of twelve coastal flood days per year, with annual totals r between four coastal flood days in 2007 and a high of 23 coastal flood days in 2024.

New Jersey Sea-Level Rise Projections Table (values in feet)

	Across Emissions Scenarios		Low Emissions (SSP1-2.6)			Intermediate Emissions (SSP2-4.5)			High Emissions (SSP3-7.0)		
Degrees of Warming (°C)†	***1.7*** *(1.3-2.5) °C Warming*	***1.9*** *(1.3-3.1) °C Warming*	***1.7*** *(1.3-2.4) °C Warming*	***1.6*** *(1.2-2.3) °C Warming*	***1.5*** *(1.1-2.3) °C Warming*	***2.3*** *(1.8–3.0) °C Warming*	***2.6*** *(2.0-3.6) °C Warming*	***2.8*** *(2.1-4.0) °C Warming*	***2.8*** *(2.2- 3.5) °C Warming*	***3.8*** *(3.0-5.0) °C Warming*	***5.1*** *(3.9-7.0) °C Warming*
Year	**2040**	**2050**	**2070**	**2100**	**2150**	**2070**	**2100**	**2150**	**2070**	**2100**	**2150**
***Extremely Likely* to be Exceeded, Including or Excluding Potential Rapid Ice-Sheet Loss Processes**											
> 95% Chance SLR Exceeds*	0.5	0.7	1.1	1.3	1.7	1.2	1.8	2.5	1.3	2.1	3.2
***Likely* Range, Excluding Potential Rapid Ice-Sheet Loss Processes**											
> 83% Chance SLR Exceeds*	0.7	0.9	1.3	1.8	2.3	1.5	2.2	3.1	1.6	2.6	3.9
~50% Chance SLR Exceeds	1.0	1.3	1.8	2.4	3.5	1.9	2.9	4.5	2.0	3.3	5.5
<17% Chance SLR Exceeds‡	1.3	1.7	2.3	3.3	4.9	2.5	3.8	6.3	2.6	4.3	7.7
Extended *Likely* Range, Including Potential Rapid Ice-Sheet Loss Processes											
<17% Chance SLR Exceeds*	1.4	1.9	2.5	3.7	5.8	2.8	4.5	12.0	3.0	5.2	16.2
***Extremely Unlikely* to be Exceeded, Including Potential Rapid Ice-Sheet Loss Processes**											
< 5% Chance SLR Exceeds*	1.7	2.3	3.2	5.1	9.4	3.5	6.2	17.9	3.9	7.5	20.2

Consistent with previous STAP Reports, Atlantic City, which has the longest tide gauge record in the state, was selected to represent the New Jersey coast. Projections for Sandy Hook and Cape May are similar. Projections for the Battery and Philadelphia are modestly lower, primarily due to lower subsidence.

New Jersey Sea-Level Rise Projections Table (values in feet)

	Across Emissions Scenarios		Low Emissions (SSP1-2.6)			Intermediate Emissions (SSP2-4.5)		
Degrees of Warming (°C)†	***1.7** (1.3-2.5) °C Warming*	***1.9** (1.3-3.1) °C Warming*	***1.7** (1.3-2.4) °C Warming*	***1.6** (1.2-2.3) °C Warming*	***1.5** (1.1-2.3) °C Warming*	***2.3** (1.8–3.0) °C Warming*	***2.6** (2.0-3.6) °C Warming*	***2.8** (2.1-4.0) °C Warming*
Year	**2040**	**2050**	**2070**	**2100**	**2150**	**2070**	**2100**	**2150**
***Extremely Likely* to be Exceeded, Including or Excluding Potential Rapid Ice-Sheet Loss Processes**								
> 95% Chance SLR Exceeds*	0.5	0.7	1.1	1.3	1.7	1.2	1.8	2.5
***Likely* Range, Excluding Potential Rapid Ice-Sheet Loss Processes**								
> 83% Chance SLR Exceeds*	0.7	0.9	1.3	1.8	2.3	1.5	2.2	3.1
~50% Chance SLR Exceeds	1.0	1.3	1.8	2.4	3.5	1.9	2.9	4.5
<17% Chance SLR Exceeds‡	1.3	1.7	2.3	3.3	4.9	2.5	3.8	6.3
Extended *Likely* Range, Including Potential Rapid Ice-Sheet Loss Processes								
<17% Chance SLR Exceeds*	1.4	1.9	2.5	3.7	5.8	2.8	4.5	12.0
***Extremely Unlikely* to be Exceeded, Including Potential Rapid Ice-Sheet Loss Processes**								
< 5% Chance SLR Exceeds*	1.7	2.3	3.2	5.1	9.4	3.5	6.2	17.9

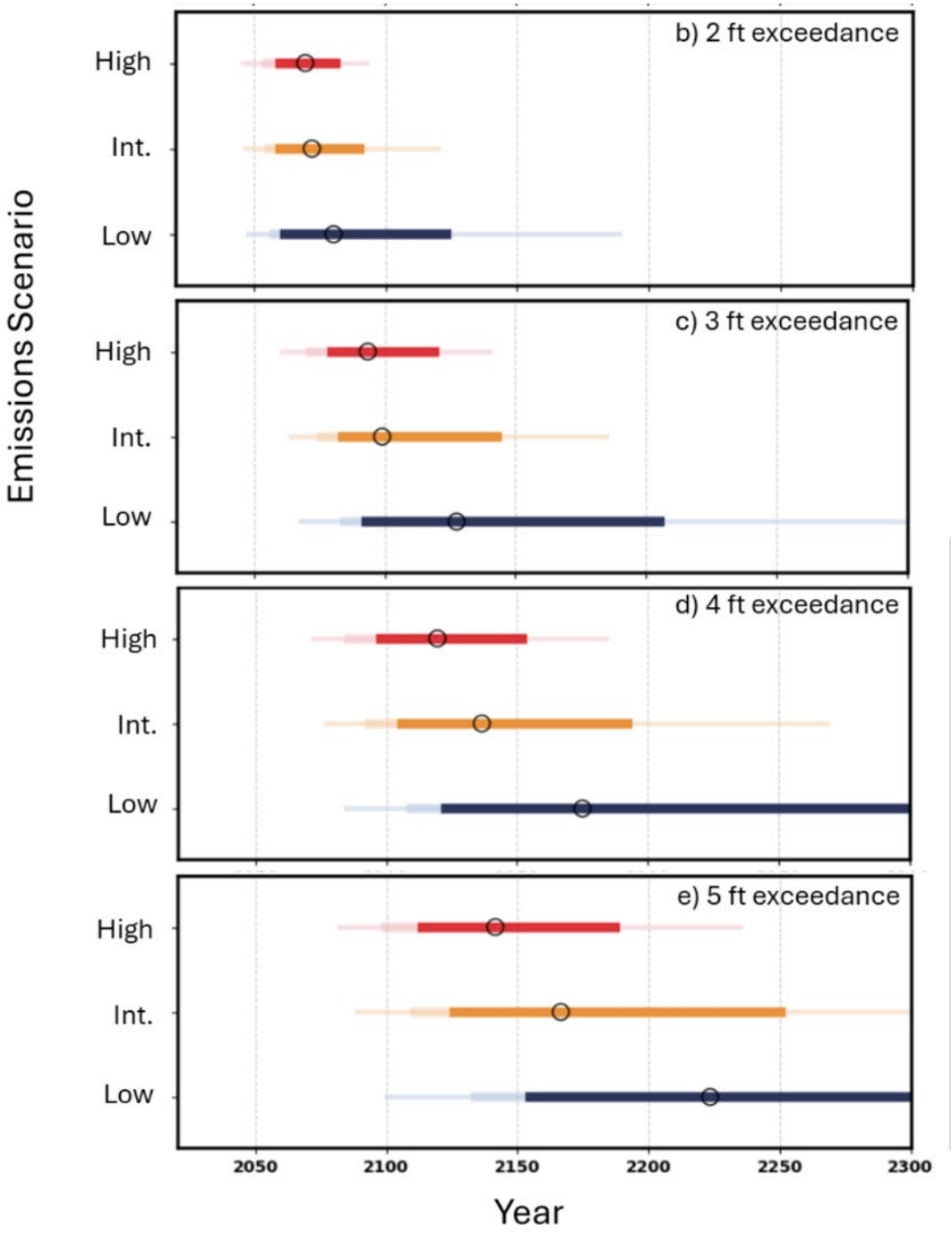
Under a **low-emissions scenario**, New Jersey SLR is likely (at least 66% chance in the absence of potential rapid ice-sheet loss processes) to exceed **2 ft (0.6 m) between 2060 and 2125** and exceed **4 ft (1.2 m) between 2120 and sometime after 2300.**

Under an **intermediate-emissions scenario**, New Jersey SLR is likely to exceed **2 ft (0.6 m) between 2055 and 2095** and exceed **4 ft (1.2 m) between 2100 and 2195.**

Under a **high-emission scenario**, New Jersey SLR is likely to exceed **2 ft (0.6 m) between 2055 and 2085** and exceed 4 **ft (1.2 m) between 2095 and 2155**.

Even accounting for the **potential impact of rapid ice-sheet loss processes**, across emissions scenarios, New Jersey SLR is **extremely unlikely (less than a 5% chance) to exceed 2 ft (0.6 m) before 2045**.

It is extremely unlikely to exceed 4 ft (1.2 m) before 2080 in a low-emissions scenario, 2075 in an intermediate-emissions scenario, and 2070 in a high-emissions scenario.



Future Coastal Flooding

Even without considering future changes to storm characteristics, future coastal flooding will be more frequent and intense due to rising sea levels.

	Average Days Per Year of Coastal Flooding (Minor, Moderate, and Major) under the Intermediate-Emissions Scenario for Atlantic City						
	Year	2020	2030	2040	2050	2070	2100	2150
Minor Flooding	***Extremely Likely* to be Exceeded, Including or Excluding Potential Rapid Ice-Sheet Loss Processes**							
	> 95% Chance SLR Exceeds*	5	6	9	15	54	131	257
	***Likely* Range, Excluding Potential Rapid Ice-Sheet Loss Processes**							
	> 83% Chance SLR Exceeds	6	9	15	29	97	227	331
	~50% Chance SLR Exceeds	8	16	35	72	194	326	363
	<17% Chance SLR Exceeds‡	13	34	80	148	297	359	365
	Extended *Likely* Range, Including Potential Rapid Ice-Sheet Loss Processes							
	<17% Chance SLR Exceeds*	13	36	93	178	326	364	365
	***Extremely Unlikely* to be Exceeded, Including Potential Rapid Ice-Sheet Loss Processes**							
	< 5% Chance SLR Exceeds*	17	61	151	262	356	365	365

Coastal Storm Findings

- Higher sea levels will increase flooding and the impacts from high tides and coastal storms, which include hurricanes and nor'easters.
- Precipitation intensity in general, including of hurricanes and nor'easters, is increasing with warming.
- Hurricane wind speed and intensification rate are also increasing with warming.

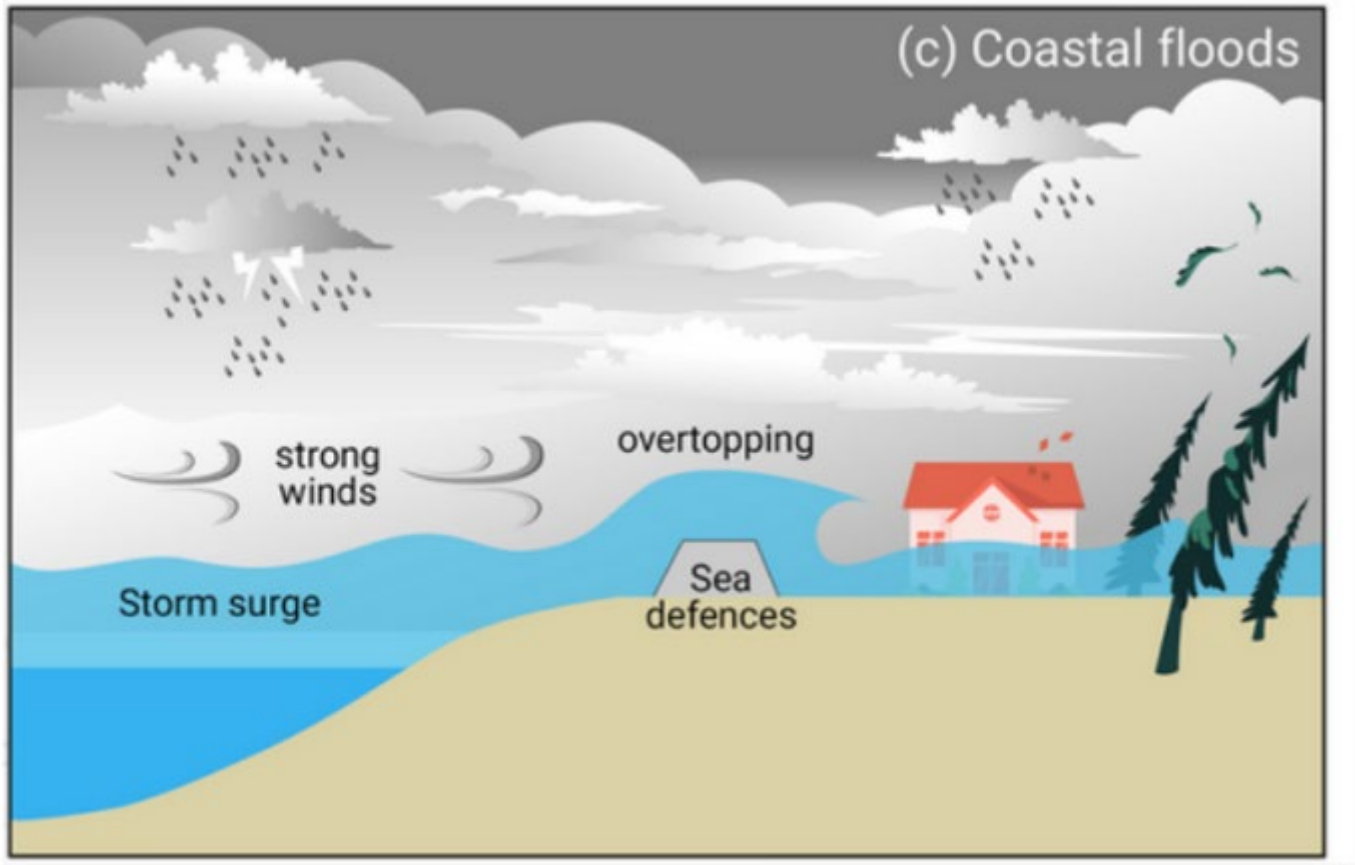


Image from Green et al. 2025.

Coastal Erosion

New Jersey's shorelines will continue to experience significant erosional pressure driven by SLR and storms, with the resulting shoreline change strongly influenced by local geomorphology and the extent of coastal engineering.

While current levels of intervention have been successful at reducing erosion rates, these efforts may become economically unsustainable in the future, particularly for lower-income communities.

Coastal Wetlands

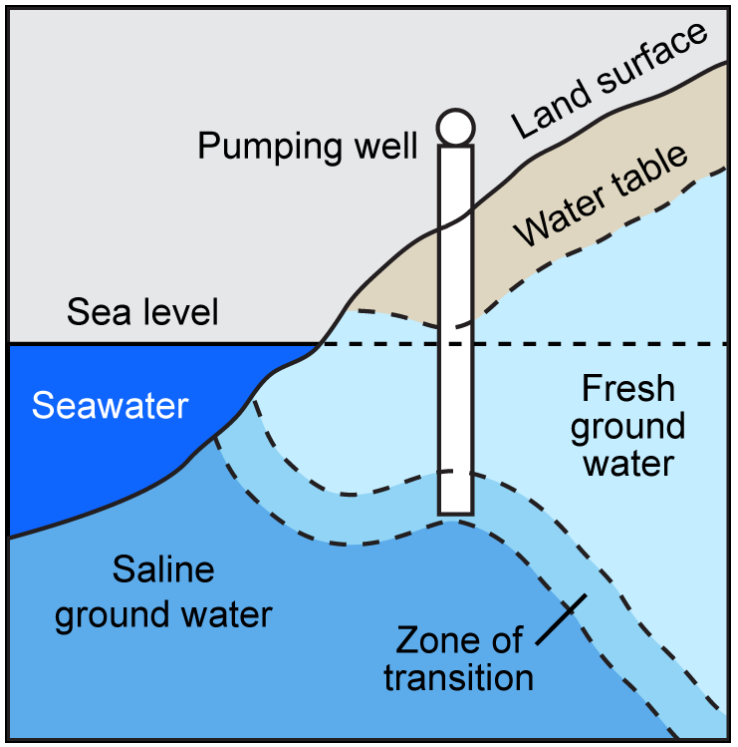
Between 1993-2021 the sea level rose an estimated 5.0 ± 1.0 mm/yr (2.0 ± 0.4 inches/decade) at Atlantic City, NJ, which is near the maximum rate of SLR that coastal wetlands may be able to keep pace with.

Saltwater Intrusion

SLR will cause saltwater intrusion in both groundwater and surface water. Barrier islands are expected to be particularly vulnerable, especially those that pump large volumes of groundwater.

However, few studies have examined site specific vulnerability to saltwater intrusion in the NJ Coastal plain, thus implying a low confidence in whether particular sites will experience saltwater intrusion over the near term (next 50 years).

Therefore, management of coastal water resources will require increased monitoring and modeling of saltwater intrusion.



Groundwater Flooding

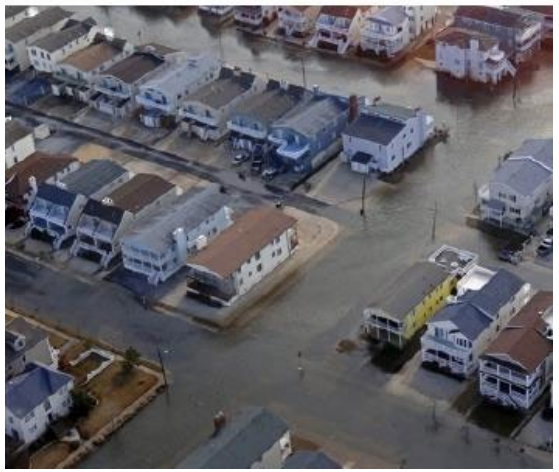
There is a high confidence that SLR will raise coastal water tables, which will lead to more groundwater flooding, but there is low confidence as to which communities will be most impacted.

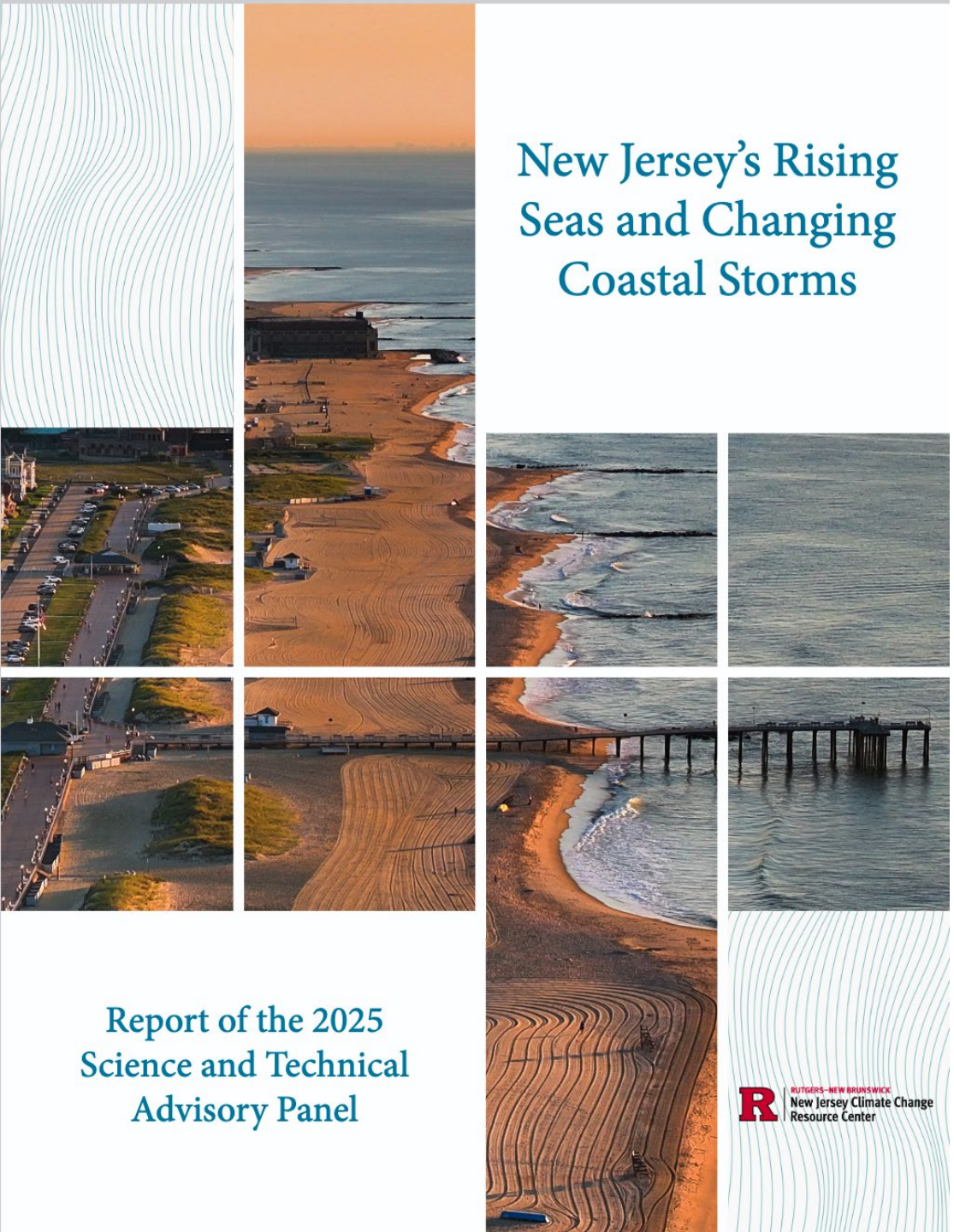
Summary of Impacts

Addressing coastal climate impacts requires an integrated and adaptive approach that considers the dynamic feedbacks among different impacts.

Human activities, including beach nourishment, hard shoreline stabilization, dredging, and coastal development, further modify these processes, sometimes amplifying vulnerabilities by constraining natural adaptation pathways.

The future resilience of New Jersey's coastal environments will be shaped by how effectively planning and management approaches integrate process-based understanding, account for nature-based strategies, and consider the differing capacities of communities to adapt.





https://go.rutgers.edu/njslr

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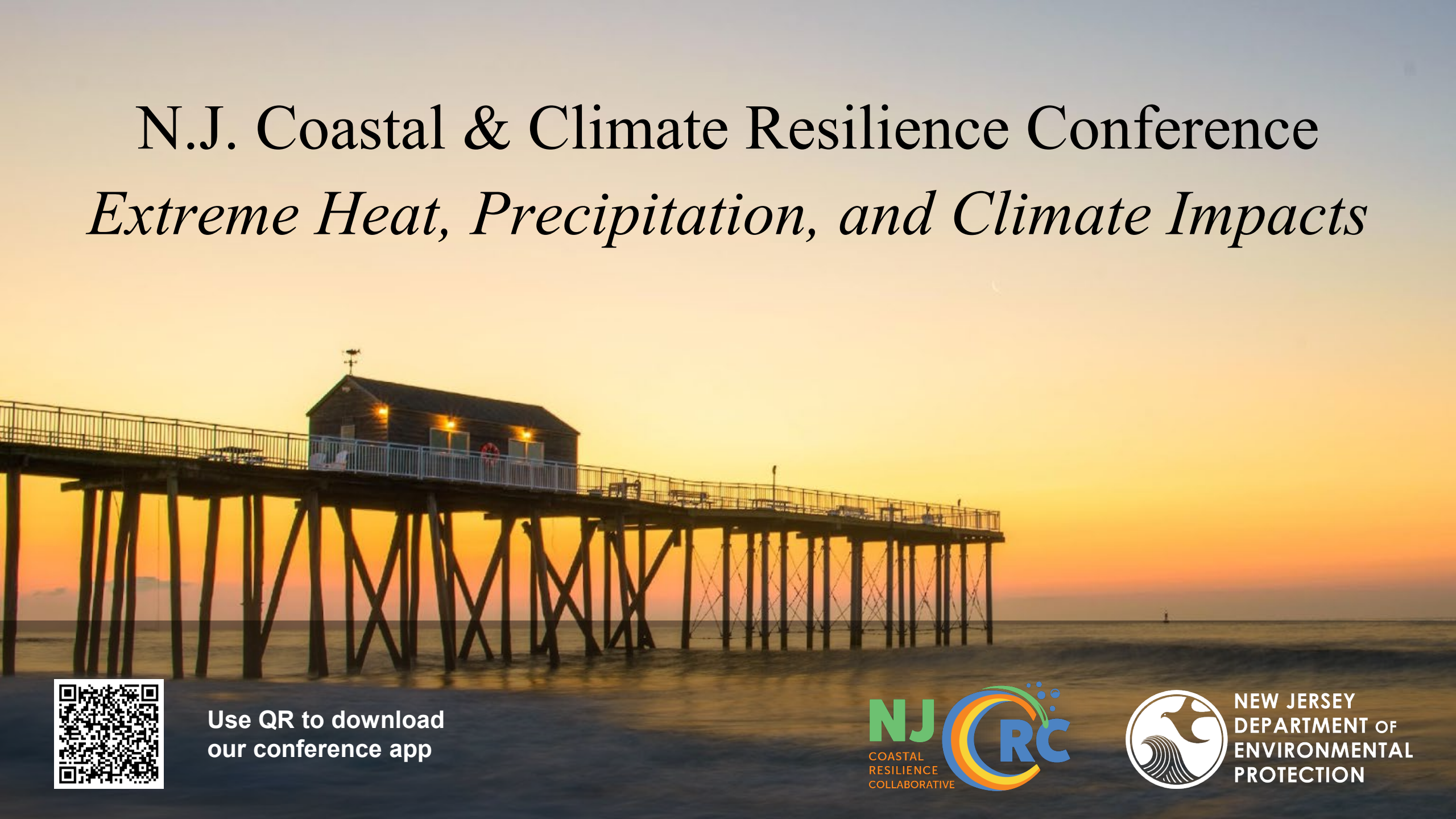
Extreme Heat, Precipitation, and Climate Impacts



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NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

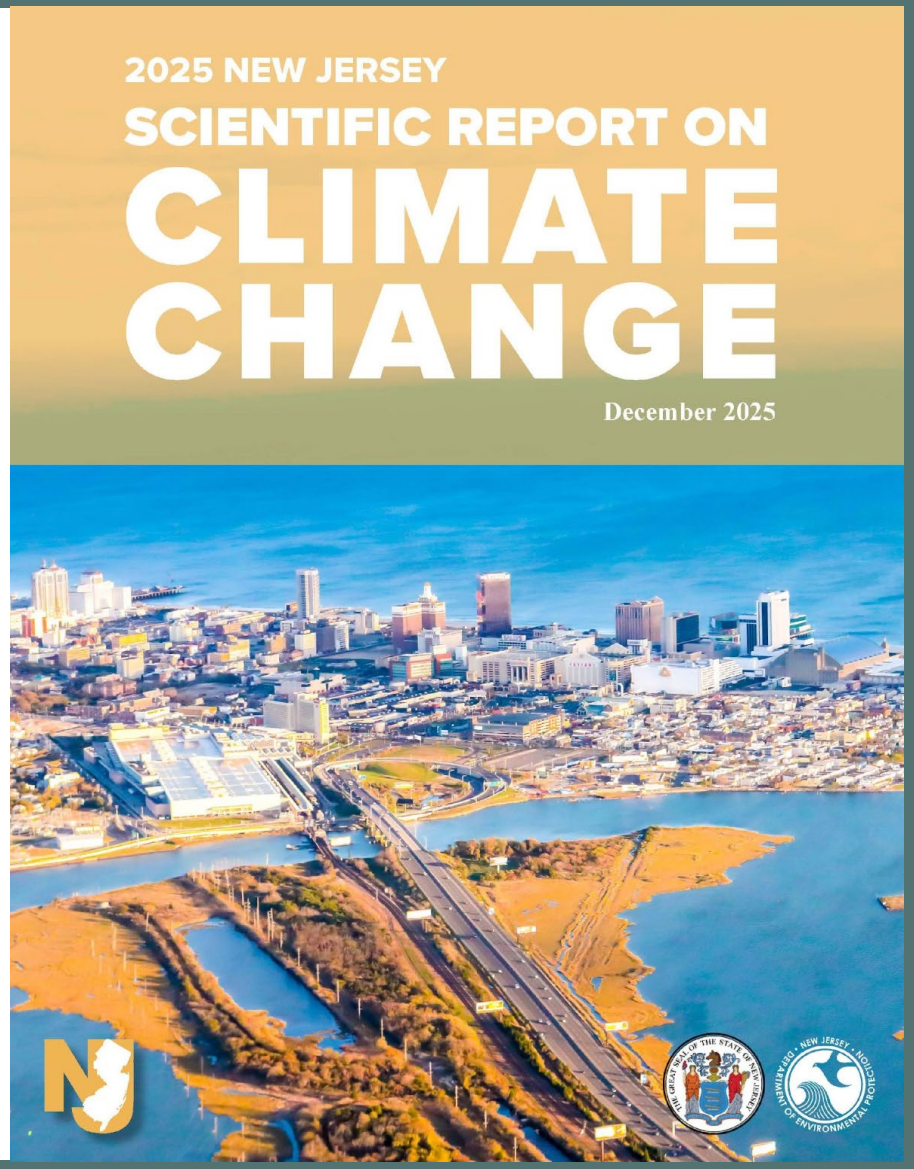

NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Scientific Report on Climate Change

https://dep.nj.gov/climatechange

- Greenhouse Gases & Climate Pollutants
- Temperature
- Precipitation
- Sea-Level Rise
- Ocean Acidification
- Resources and Ecosystem Impacts
- Human Health and Communities
- Research and Data Gaps

Web resource "Climate Change in New Jersey: Impacts and Effects" https://dep.nj.gov/climatechange/science/overview



Climate Science

It's getting hotter:

- NJ's average annual temperature increased 4.1°F from 1895 to 2024.
- 2024 was the 2nd warmest on record - 2.1°F above the 30-year normal of 53.6°F.

It's getting wetter:

- The top 1% of all storms in the NE have increased by 60% between 1958 and 2021, more than any other region in the nation.

It's getting deeper:

- **Flooding:** Coastal flooding days in NJ has increased and will continue to increase. Inland flooding is more susceptible to increased frequency and intensity of heavy rainfalls.
- **SLR:** Over the two millennia prior to the late nineteenth century, NJ sea-level rose at an average rate of about 0.5 ± 0.1 inches/decade

It's Getting Hotter

	Increase in NJ Air Temperature from 1895 to 2024 (°F)				
	Annual	Winter	Spring	Summer	Fall
Statewide	**4.1**	5.6	3.5	3.6	3.4
North	**4.2**	6.0	3.6	3.5	3.5
South	**4.0**	5.4	3.4	3.6	3.3
Coast	**4.6**	5.8	4.0	4.2	3.9

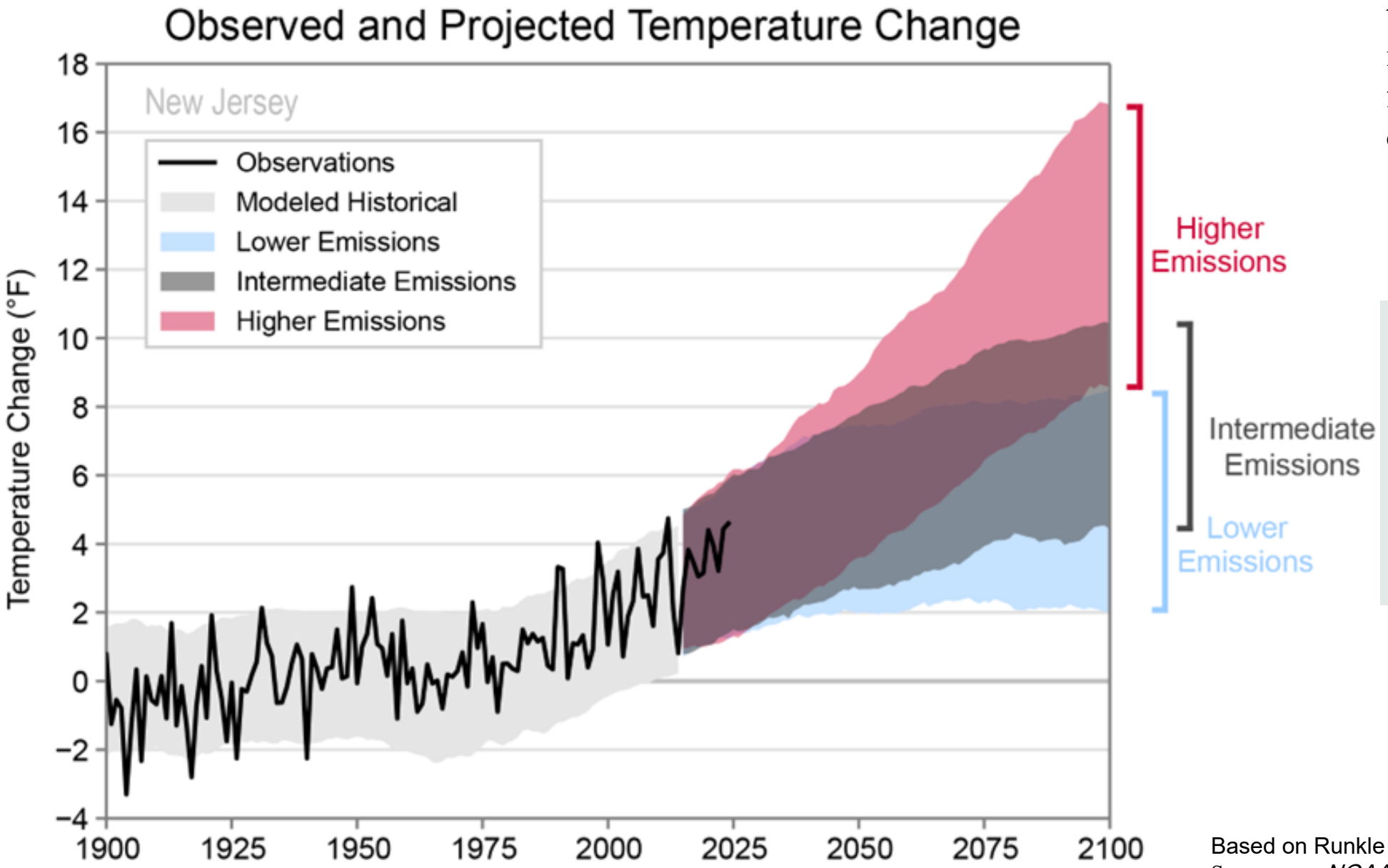
Based on data from the Office of the NJ State Climatologist

30-year Heat Waves Trends (1994-2023)

- Heat wave frequency and heat wave temperature range have experienced significant changes (an increase and decrease, respectively)
- The duration of heat waves did not significantly change.
- Overall, there is a trend toward more heat waves in recent years and less daily cooling associated with each one.

https://dep.nj.gov/wp-content/uploads/dsr/heatwave-analysis.pdf

New Jersey: Temperatures



Observed and projected changes (compared to the 1901–1960 average) in near-surface air temp for New Jersey, averaged over 5-year periods.

By 2050:
3°F to 8°F (Inter)

By 2100:
2°F to 8°F (lower)
4°F to 10°F (Inter)
7.4°F to 18°F (high)

Based on Runkle et al., 2022 New Jersey State Climate Summary. *NOAA Technical Report NESDIS 150-NJ*

It's Getting Wetter

POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 2, Version 3

PF tabular | PF graphical | Supplementary information | Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.347 (0.316-0.381)	0.414 (0.377-0.455)	0.492 (0.447-0.540)	0.549 (0.497-0.603)	0.619 (0.558-0.679)	0.671 (0.601-0.737)	0.7[illegible]2 (0.645-[illegible]795)	0.770 (0.683-0.851)	0.831 (0.729-0.924)	0.877 (0.763-0.982)
10-min	0.555 (0.505-0.609)	0.663 (0.604-0.728)	0.788 (0.716-0.865)	0.878 (0.795-0.964)	0.987 (0.890-1.08)	1.07 (0.958-1.17)	1.[illegible]5 (1.02-[illegible].26)	1.22 (1.08-1.35)	1.31 (1.15-1.46)	1.38 (1.20-1.55)
15-min	0.693 (0.631-0.761)	0.833 (0.759-0.916)	0.997 (0.906-1.10)	1.11 (1.01-1.22)	1.25 (1.13-1.37)	1.35 (1.21-1.49)	1.[illegible]5 (1.29-[illegible].60)	1.54 (1.37-1.70)	1.65 (1.45-1.84)	1.73 (1.51-1.94)
30-min	0.950 (0.865-1.04)	1.15 (1.05-1.26)	1.42 (1.29-1.56)	1.61 (1.46-1.77)	1.85 (1.67-2.03)	2.04 (1.83-2.24)	2.[illegible]2 (1.96-[illegible].45)	2.40 (2.13-2.65)	2.63 (2.31-2.93)	2.81 (2.44-3.14)
60-min	1.19 (1.08-1.30)	1.44 (1.32-1.59)	1.82 (1.65-1.99)	2.10 (1.90-2.30)	2.47 (2.22-2.71)	2.76 (2.48-3.03)	3.[illegible]6 (2.73-[illegible].37)	3.36 (2.98-3.72)	3.78 (3.31-4.20)	4.10 (3.57-4.59)
2-hr	1.44 (1.30-1.58)	1.75 (1.59-1.93)	2.21 (2.01-2.43)	2.57 (2.33-2.82)	3.06 (2.75-3.36)	3.45 (3.09-3.79)	3.[illegible]6 (3.43-[illegible].25)	4.27 (3.77-4.72)	4.86 (4.23-5.41)	5.32 (4.59-5.96)
3-hr	1.57 (1.43-1.74)	1.92 (1.74-2.12)	2.43 (2.20-2.69)	2.83 (2.55-3.13)	3.39 (3.04-3.74)	3.84 (3.42-4.25)	4.[illegible]2 (3.81-[illegible].79)	4.82 (4.21-5.35)	5.51 (4.75-6.16)	6.08 (5.17-6.83)
6-hr	1.98 (1.79-2.20)	2.40 (2.17-2.67)	3.03 (2.73-3.37)	3.55 (3.18-3.93)	4.29 (3.82-4.75)	4.91 (4.34-5.44)	5.[illegible]3 (4.8[illegible]-[illegible].19)	6.30 (5.45-7.00)	7.34 (6.23-8.21)	8.20 (6.87-9.25)
12-hr	2.39 (2.17-2.69)	2.90 (2.62-3.25)	3.69 (3.32-4.13)	4.36 (3.91-4.87)	5.36 (4.75-5.97)	6.23 (5.48-6.95)	7.[illegible]0 (6.23-[illegible].01)	8.24 (7.03-9.24)	9.82 (8.21-11.1)	11.2 (9.18-12.7)
24-hr	2.76 (2.54-3.01)	3.33 (3.07-3.64)	4.26 (3.93-4.64)	5.05 (4.64-5.50)	6.24 (5.68-6.76)	7.26 (6.58-7.87)	8.40 (7.51-9.09)	9.66 (8.55-10.5)	11.6 (10.1-12.6)	13.2 (11.3-14.4)
2-day	3.18 (2.92-3.48)	3.85 (3.55-4.22)	4.93 (4.53-5.39)	5.84 (5.34-6.38)	7.18 (6.52-7.81)	8.32 (7.50-9.05)	9.57 (8.56-10.4)	11.0 (9.69-11.9)	13.0 (11.3-14.2)	14.7 (12.7-16.2)
3-day	3.37	4.08	5.19	6.12	7.48	8.63	9.88	11.3	13.3	15.0

https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nj

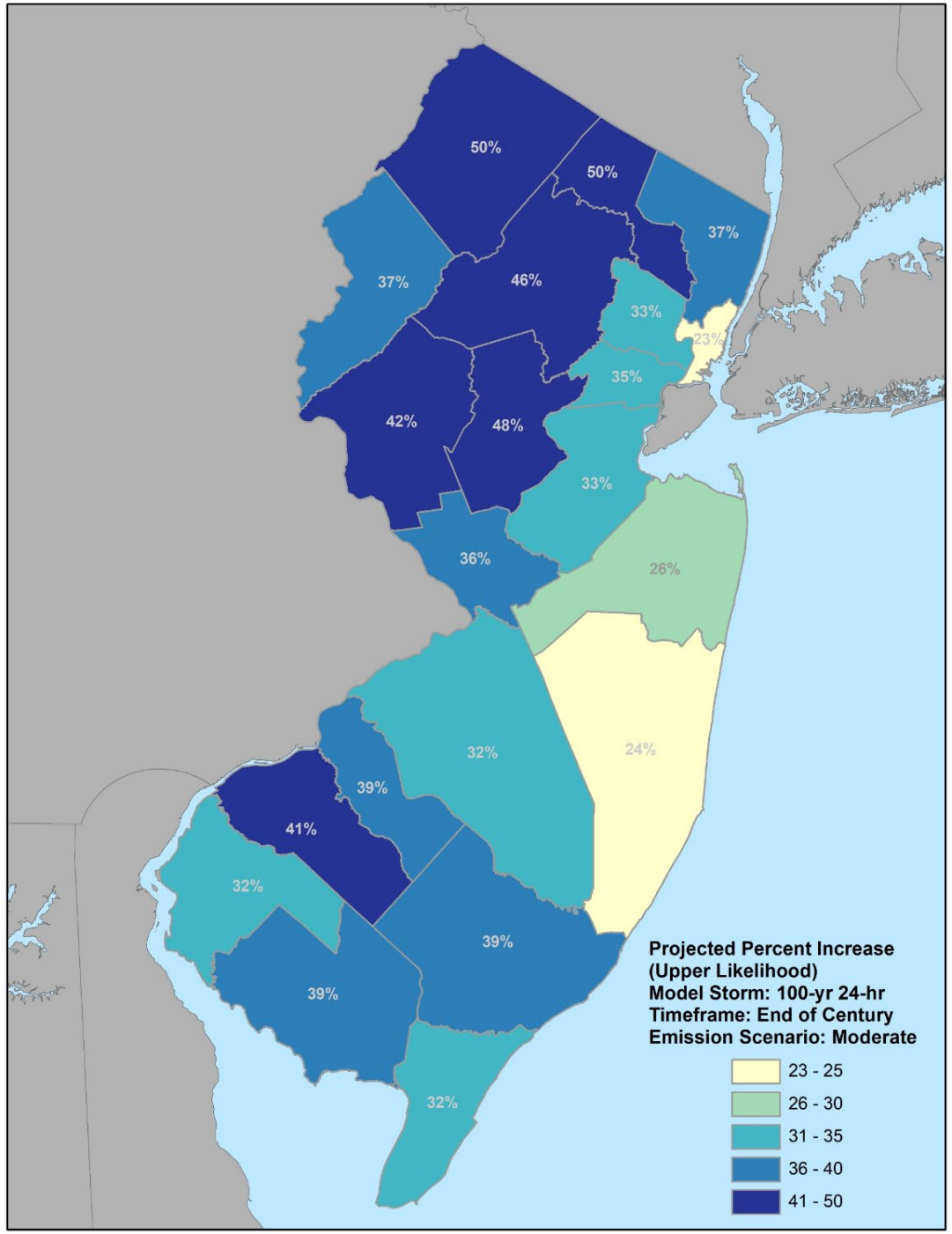
NOAA ATLAS 14
PRECIP. ESTIMATES

Problem:

Last updated in 2006 with data through 2000

In some places, the addition of 20 years of data results in a more than 10% increase in rainfall above published estimates.

DeGaetano and Tran. 2021. Changes in Hourly and Daily Extreme Rainfall Amounts in NJ since the Publication of NOAA Atlas 14 Volume



Precipitation changes: Storm Intensity

Moderate Emission Scenario
End of Century

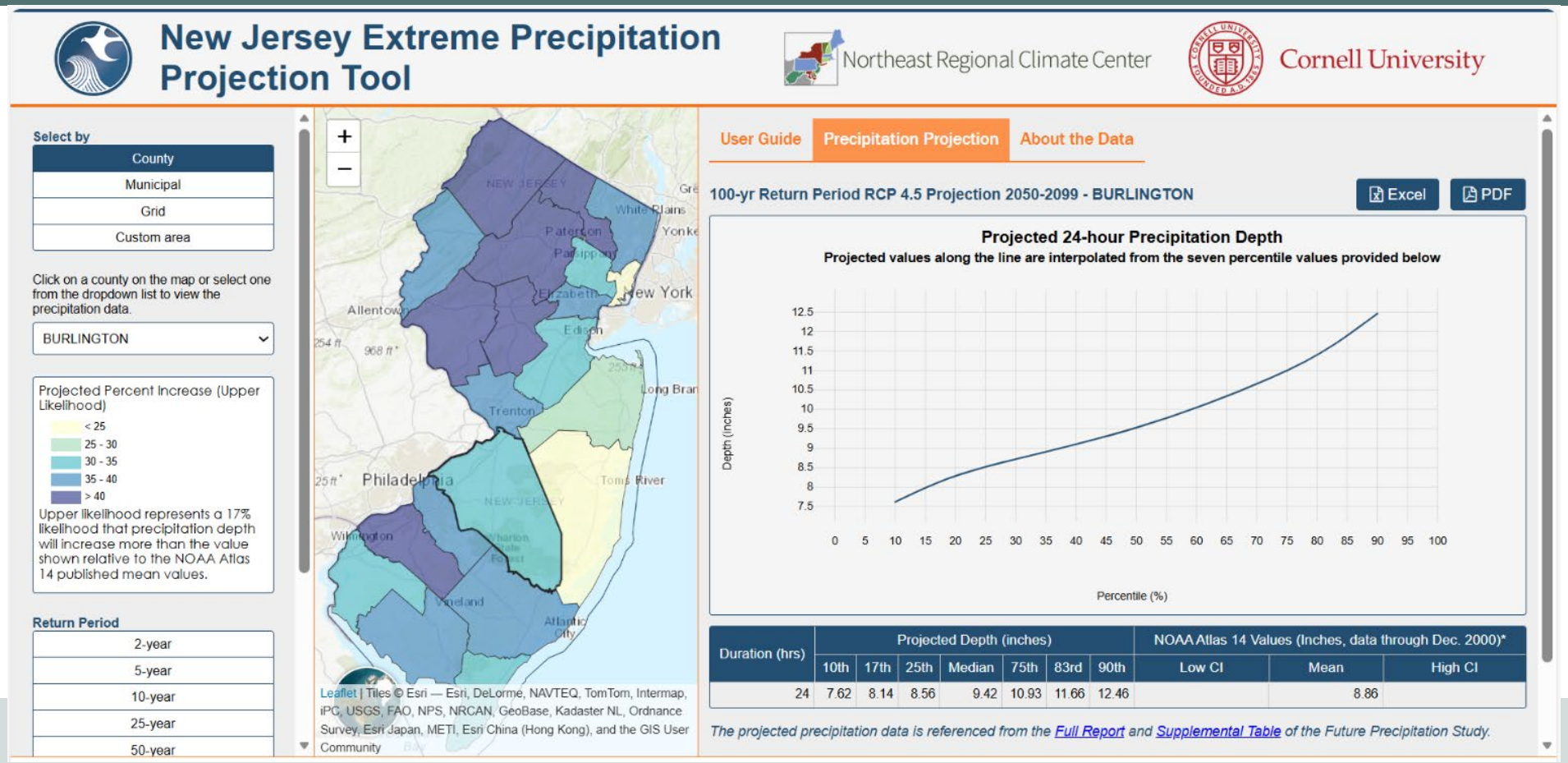
100yr – 24hr Storm

Upper Likelihood -
(17% likelihood that projections can be higher)

Percentages on the map represent the projected percent increase in rainfall depth relative to current published values

DeGaetano. 2021. Projected Changes in Extreme Rainfall in New Jersey based on an Ensemble of Downscaled Climate Model

Future Projections Of Intensity



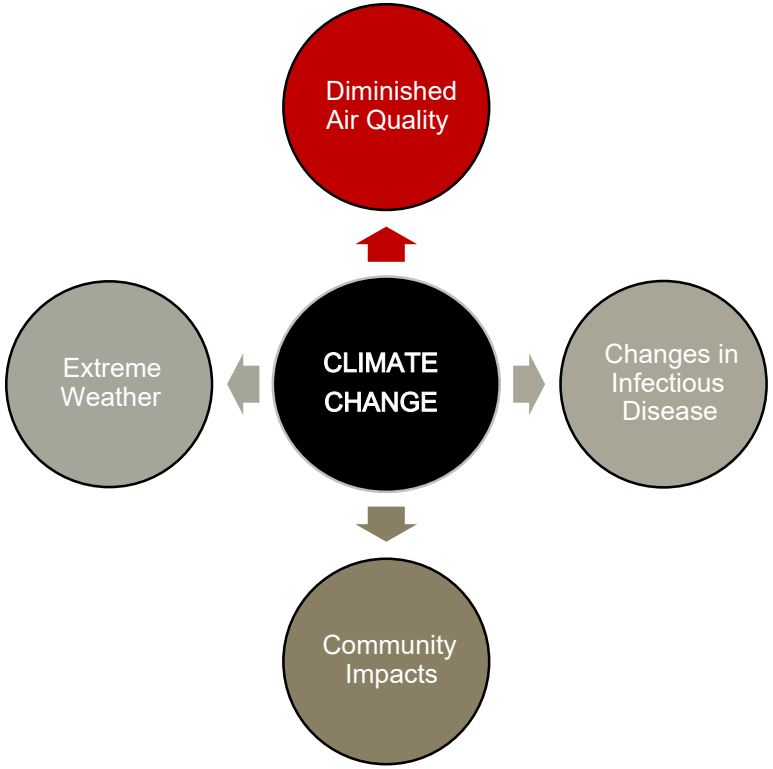
https://njprojectedprecipitationchanges.com/

Impacts to Water Quality

- Changes in precipitation, especially increases, will increase the rate of runoff and streambank erosion…
- …lead to an increase in sediment downstream and subsequent increases in nutrients, pollutants, TDS, conductivity, and turbidity, etc.
- Collectively, increased water temperature along with increased nutrients and TDS amplifies the potential for reduced dissolved oxygen levels, especially in summer.
- Increase in nutrient loading increases the potential for more frequent and extended HAB events.

Human Health & Communities

- **Heat waves** and **heavy precipitation** can lead to both immediate and long-term effects on cardiovascular, respiratory, and gastrointestinal systems.
- Extreme heat can also have a dramatically adverse impact mental health, behavior, and sleep.
- Deterioration of **air quality** from climate change will lead to greater instances of cardiovascular disease, respiratory illnesses, and cancers, especially in vulnerable populations.
- More favorable environmental conditions for **pathogens** and their hosts will increase infectious diseases spread by harmful arthropods/insects and microorganism contamination.
- Food and water **insecurity** will become an increasing concern as impacts to the agricultural sector and water sustainability is threatened by storm surges, flooding, sea-level rise.



Disproportionate Effects of Climate Change

Overburdened Communities (OBCs) are subject to the most severe consequences, including:

- Children, the elderly, individuals with chronic health conditions, and people who work outside are most vulnerable to the adverse impacts of climate change.
- Heat island effects, poor air quality, prevalence of chronic illnesses, decreased access to healthy food options
- Environmental and public health stressors lead to higher rates of asthma, cancer, elevated blood lead levels, cardiovascular disease, etc.

Thank You!

Nick Procopio

NJDEP Division of Science and Research

nick.procopio@dep.nj.gov

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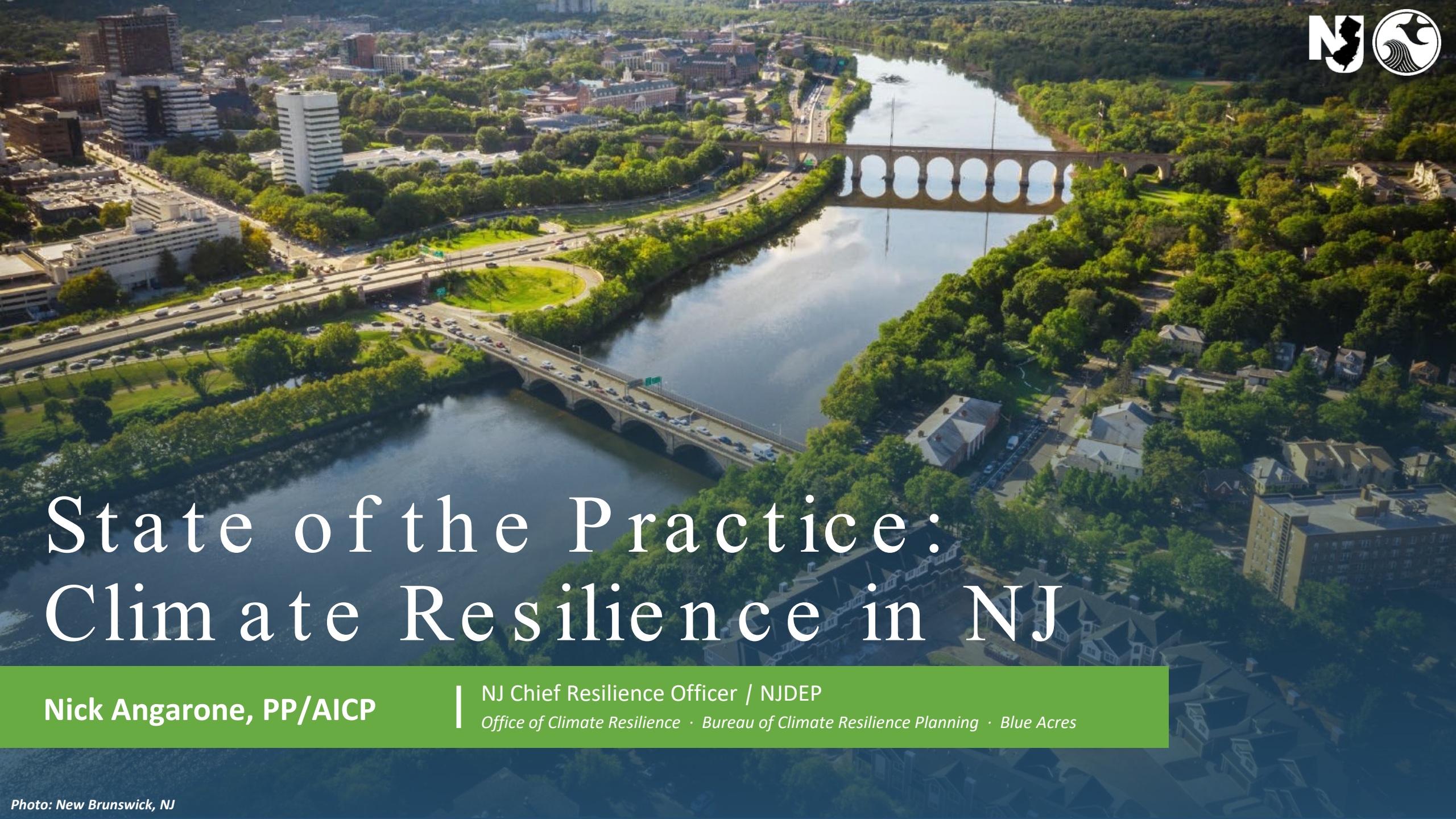
NJ CRC COASTAL RESILIENCE COLLABORATIVE

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION



State of the Practice: Climate Resilience in NJ

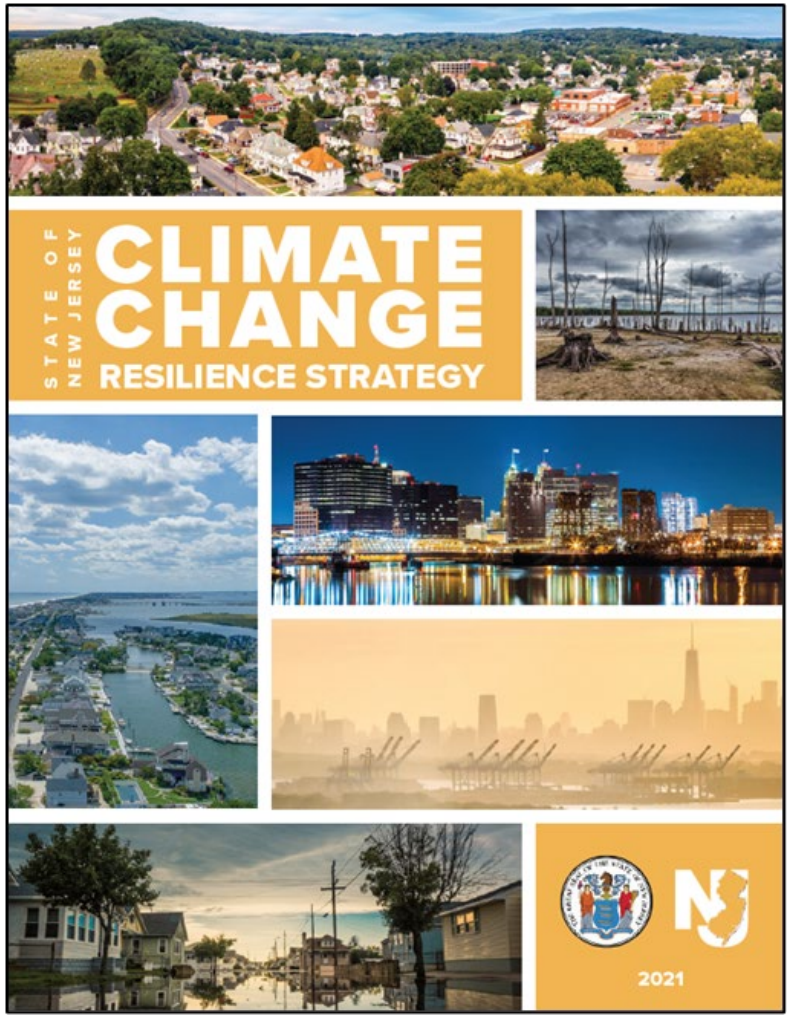
Nick Angarone, PP/AICP

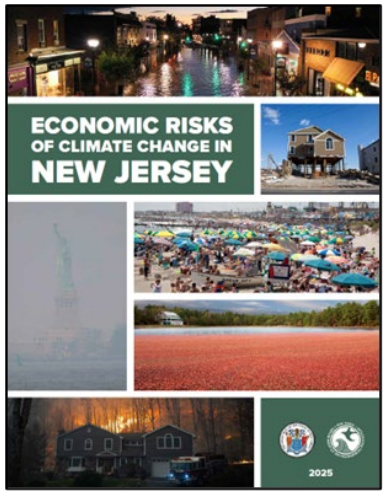
NJ Chief Resilience Officer / NJDEP

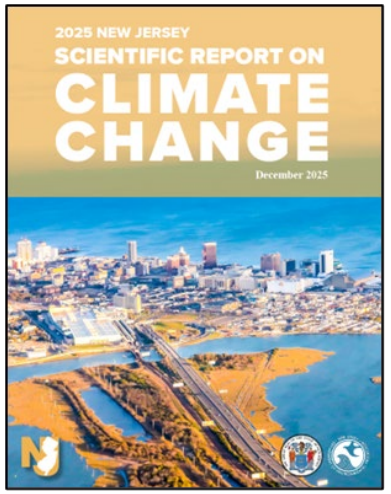
Office of Climate Resilience · Bureau of Climate Resilience Planning · Blue Acres

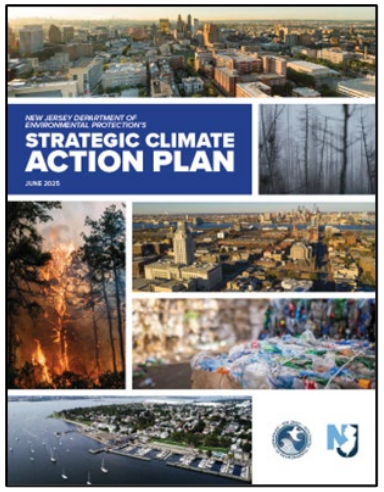
Photo: New Brunswick, NJ

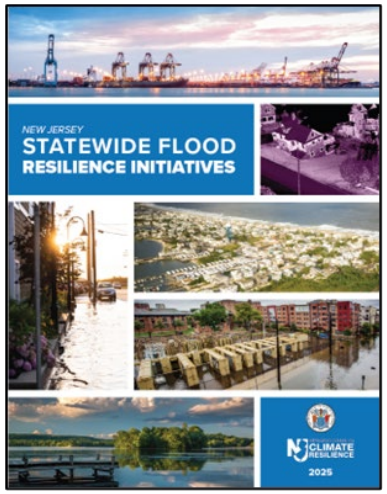
LAYING THE GROUNDWORK











REGULATORY & POLICY ACTION

MODERNIZING LAND USE REGULATIONS

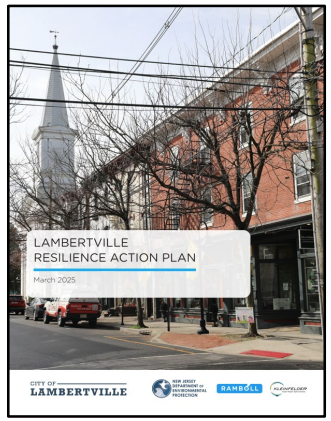
LAW ON FLOOD RISK NOTIFICATION

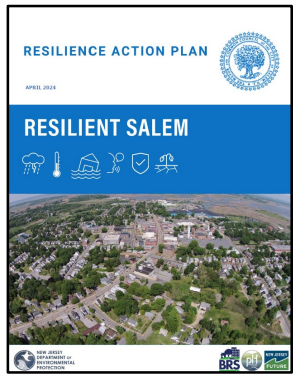
MUNICIPAL LAND USE LAW AMENDMENT - CCRHVA

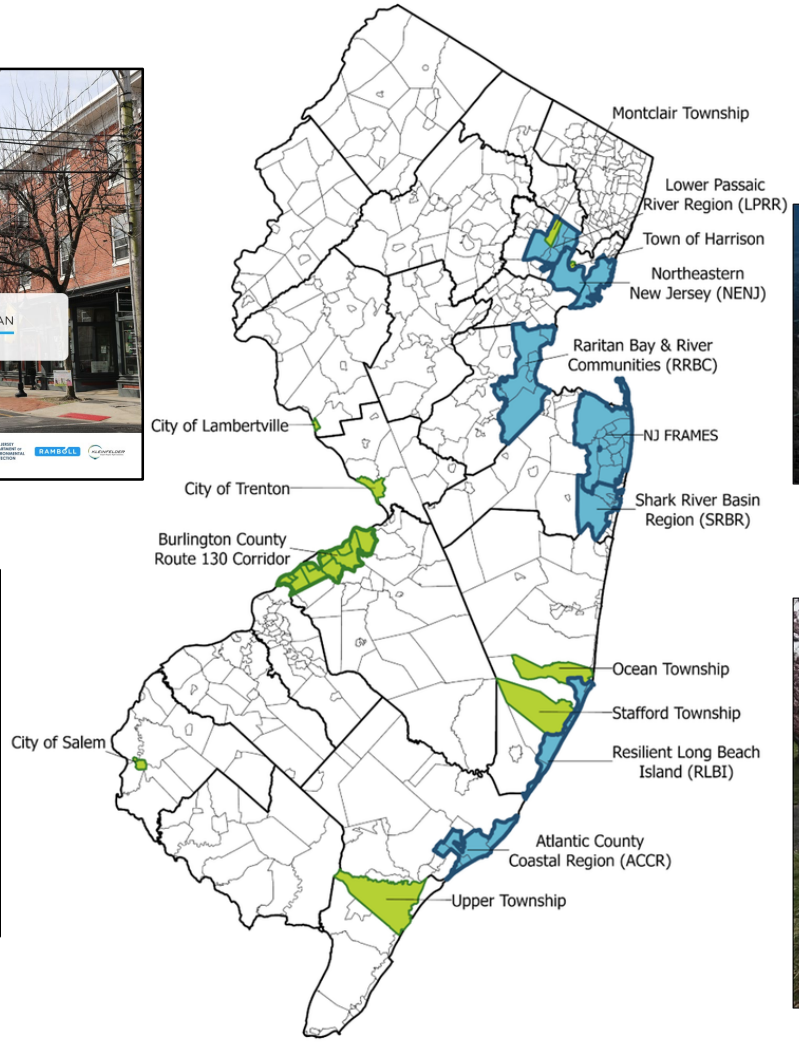
SUPPORTING LOCAL RESILIENCE

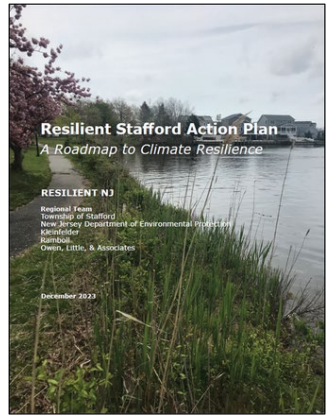
RESILIENT NJ

- 59 communities in the program
  - 41 CCRHVAs developed through RNJ
- 12 Resilience Action Plans developed
  - $31M in successful funding applications stemming from these plans
- Online tools, guidance, and resources for self-led planning & implementation









SUPPORTING LOCAL RESILIENCE

BLUE ACRES

- 144 buyout properties closed since Ida, 84 demolished
  - 150 buyouts currently in progress through state & federal funds
- Expanding public outreach and education around buyouts
- Post-demo land use restoration in four towns since Ida

Photos: Downe Township, NJ

MOVING PLANS INTO ACTION

Building a

CLIMATE READY NJ

A $72M+ federal investment in New Jersey's resilience that will establish and expand a resilience pipeline:

- Community-led vulnerability assessments and planning
- Co-designing natural and nature-based solutions
- Implementing green and gray construction projects
- Enduring capacity: education, engagement, outreach

OFFICE OF CLIMATE RESILIENCE

New Jersey Department of Environmental Protection

www.dep.nj.gov/ocr

General Inquiries
climateresilience@dep.nj.gov

Coastal Management Program
njcmp@dep.nj.gov

Blue Acres
blueacres@dep.nj.gov

@njcoastalmanagement
@nj.dep
@newjerseydep

HOW WE SUPPORT A RESILIENT NEW JERSEY

Coordinating state-level resilience policy

- Interagency Council on Climate Resilience
- Climate Change Resilience Strategy
- Extreme Heat Resilience Action Plan

Supporting science-based decision making

- Scientific Report on Climate Change
- Climate Tools and Web Apps

Protecting our people, property, and investments from future climate conditions

- NJPACT REAL Rules
- Law on Property Flood Risk Notification
- Blue Acres

Incorporating climate resilience into state funding programs

- Water Infrastructure Investment Plan

Helping communities plan for climate change

- Resilient NJ
- Local Planning for Climate Change Toolkit

Supporting resilience projects at every scale and step

- Building a Climate Ready NJ
- Rebuild by Design
- Climate Resilience Funding Directory

Developing tools to empower local climate resilience action

- Heat Hub NJ
- MyCoast NJ
- A Seat at the Table

Scan for links to all resources

N.J. Coastal & Climate Resilience Conference

Climate Ready Restoration

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our conference app

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COASTAL
RESILIENCE
COLLABORATIVE

NEW JERSEY
DEPARTMENT OF
ENVIRONMENTAL
PROTECTION

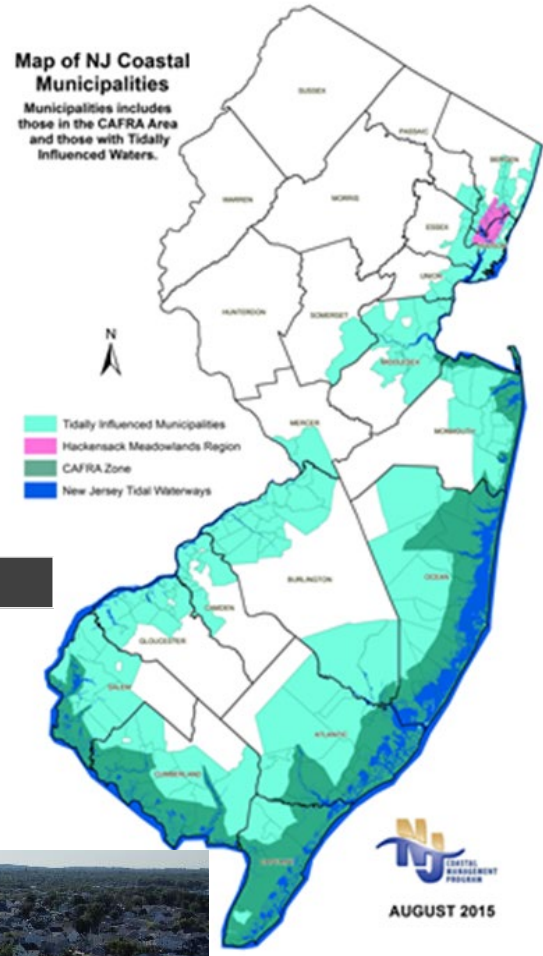
Climate -Ready Restoration

State of the Practice in New Jersey

Danielle McCulloch
Executive Director
American Littoral Society

Climate Science, Policy, and Restoration

- Climate Science State Policy Response On-the-ground Action
- Restoration = building climate-ready infrastructure using nature and nature-based solutions.
- Problems:
  - 2%+ loss rate of coastal marsh habitat every 10 years*
  - Shoreline erosion rates ~2-5 m/yr* (largest losses are on the edge)
  - SET data accretion rates < SLR rate*



SLR = 5.11+/- 0.44 mm/yr**

* Weis, Judith S., et al. "The status and future of tidal marshes in New Jersey faced with sea level rise." Anthropocene Coasts 4.1 (2021)
** NOAA Tides and Currents

NJ Coastal Species

Why Use Nature for Climate Readiness?

Restoration = restoring ecological processes and achieving resilience and storm-preparedness objectives w/ nature

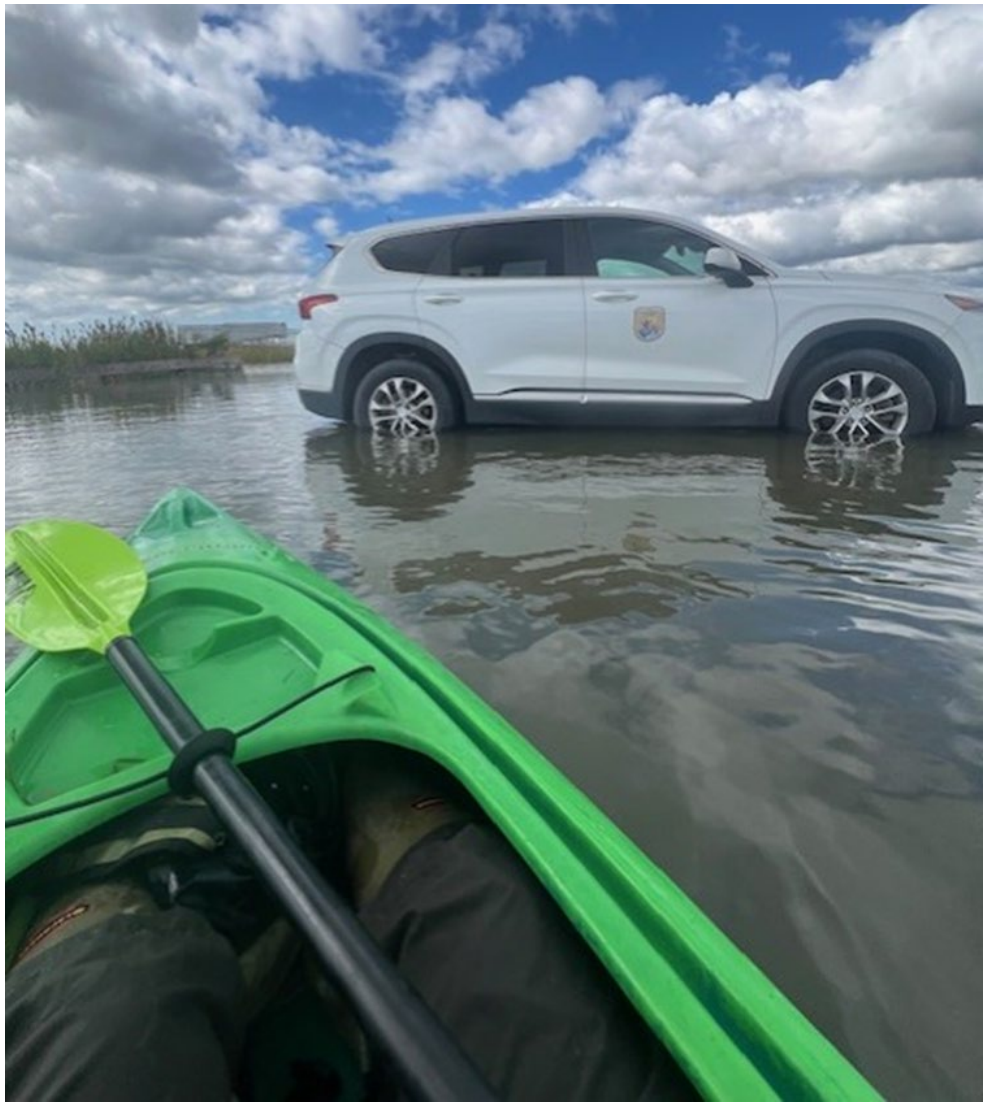
- Mitigate wave energy
- Capture and store sediment and carbon
- Reduce repeated flooding and flood damage
- Provide habitat and water quality benefits

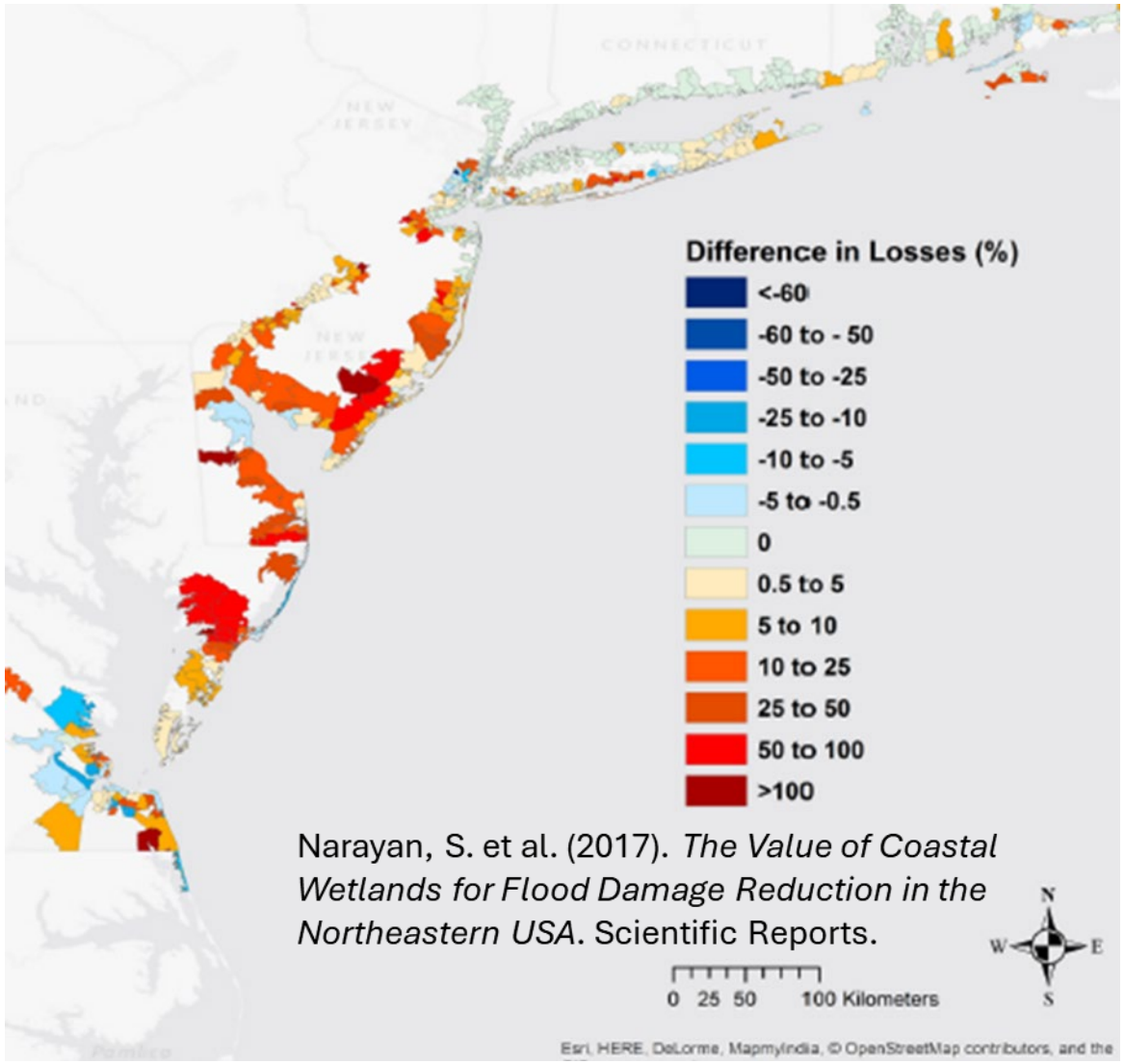
Investing in Nature provides long-term ROI

- $1 invested in resilience = $6–13 in saved damages or benefits.*
- NJ coastal economy = ~$80B annually.**
- Tourism 507,000 jobs in New Jersey (about 1 in 12 jobs)**
- $21,000 per acre marsh in climate change mitigation benefits***
- Marshes = $625M in avoided damages during Sandy****

Nature is climate-ready infrastructure and an economically smart investment in New Jersey

*National Institute of Building Sciences (NIBS) *Natural Hazard Mitigation Saves Report;* U.S. Chamber of Commerce Foundation. *The Preparedness Payoff: The Economic Benefits of Investing in Climate Resilience*.
**NJ Division of Travel & Tourism, *Economic Impact of Visitors to New Jersey* (2024).
***United States Environmental Protection Agency. Economic Benefits of Wetlands. (2016)
****Narayan et al 2017

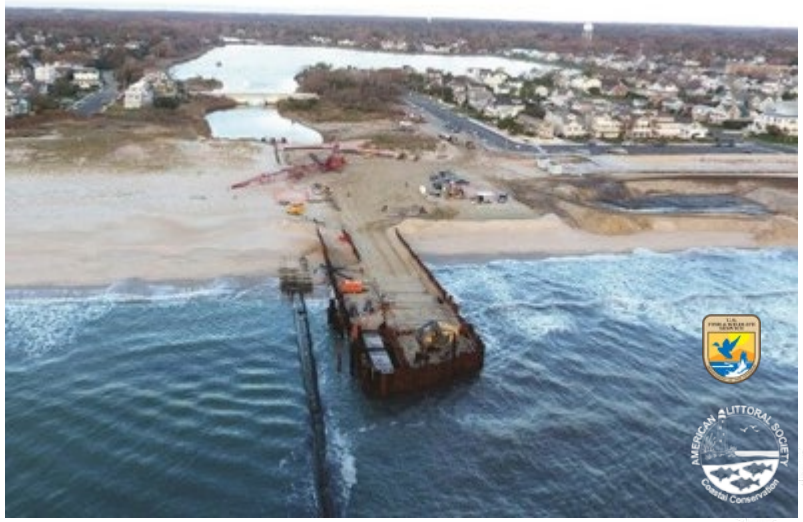


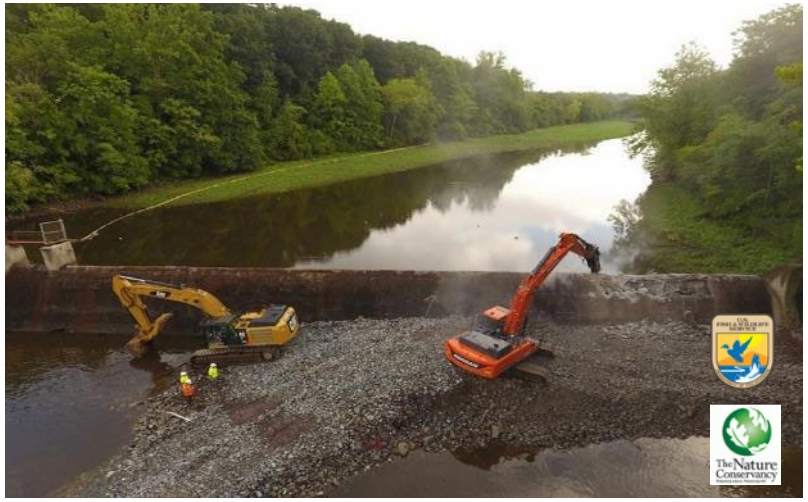


Nature is climate-ready infrastructure and an economically smart investment in New Jersey

NJ's Restoration Toolkit

NJ's Restoration Toolkit



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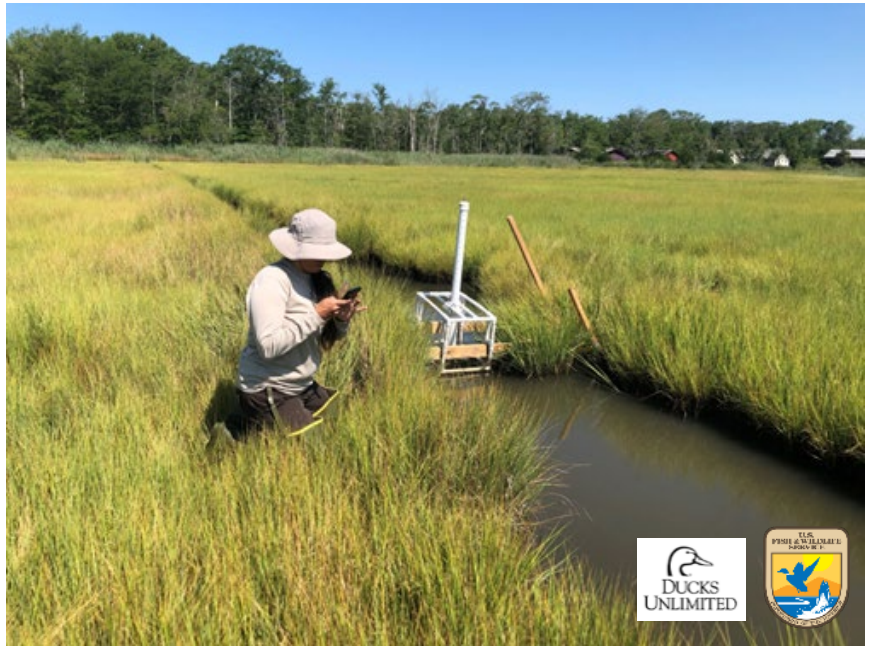
DUCKS
UNLIMITED


AMERICAN LITTORAL SOCIETY
Coastal Conservation


AMERICAN LITTORAL SOCIETY
Coastal Conservation

Lessons Learned Since our Last Big Storm

- Sediment is an extremely valuable and strategic resource
- Design using long-term trends
- Think landscape scale
- Hybrid solutions often work best

New Jersey DEP Leadership on Climate Readiness

- **Impactful State programs**
  - NJ PACT REAL and climate-forward policy: improves implementation
  - Natural Climate Solutions Program
  - Resilient NJ
  - Shore Protection Program
  - Water Quality Restoration Grants
  - Ready to Be Resilient Stormwater & Resilience Program
  - Green and Blue Acres
  - Many others…
- **Investing in nature-based solutions strengthens disaster preparedness and allows us to take ownership despite federal uncertainties**

Restoring the Mouth of the Maurice River, NJ

NCS-Supported Natural Infrastructure Project

Maurice River Township, Cumberland County, NJ

Time series showing the erosion of NW Reach ● & Basket Flats ●

State –funded Partnerships Deliver Long -Lasting Solutions!

Maurice River Project from State RGGI funds: protected a working waterfront vulnerable for decades, using nature - based solutions.

Concluding Comments

The next 5 years

Goal: move to landscape-level resilience :

- Need reliable funding
- Integrated sediment management
- Aligning Fed&State regulations
- Workforce development
- More efficiency in use of resources, partnerships and streamlining processes to overcome hurdles

To get there:

- Proactive planning and climate science-backed decision-making
- Investment in natural infrastructure
- Investment in workforce
- Collaboration across sectors

NJ COASTAL RESILIENCE COLLABORATIVE

Danielle McCulloch

Executive Director

American Littoral Society

Danielle@LittoralSociety.org

N.J. Coastal & Climate Resilience Conference

Climate Resilience in NJ: State of the Science-State of the Practice

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