Assessing the Risk

Climate risk in the Hudson Valley

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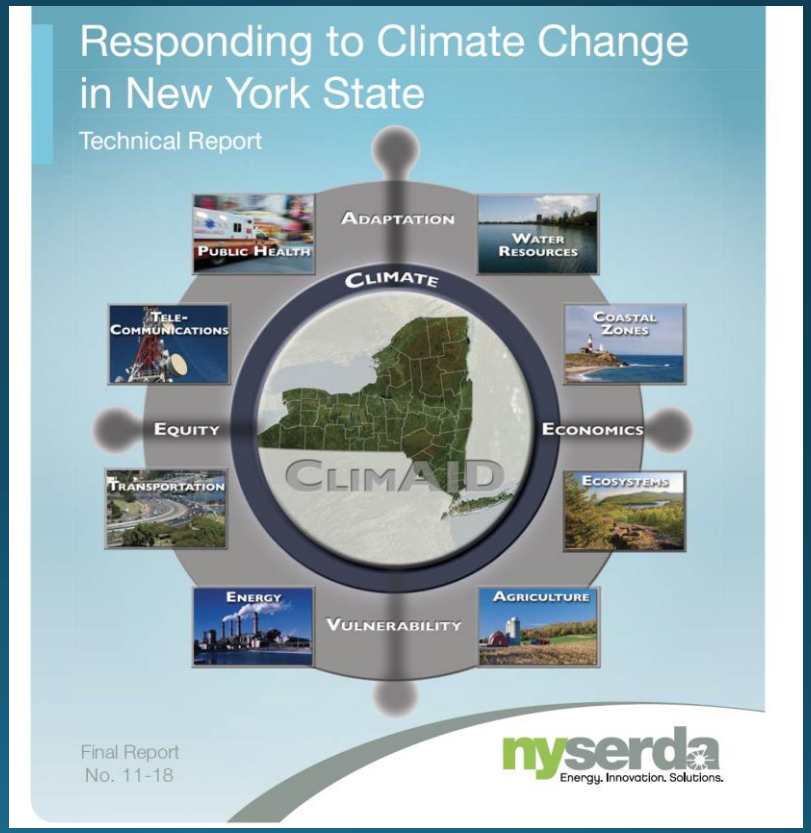
Responding to Climate Change in New York State

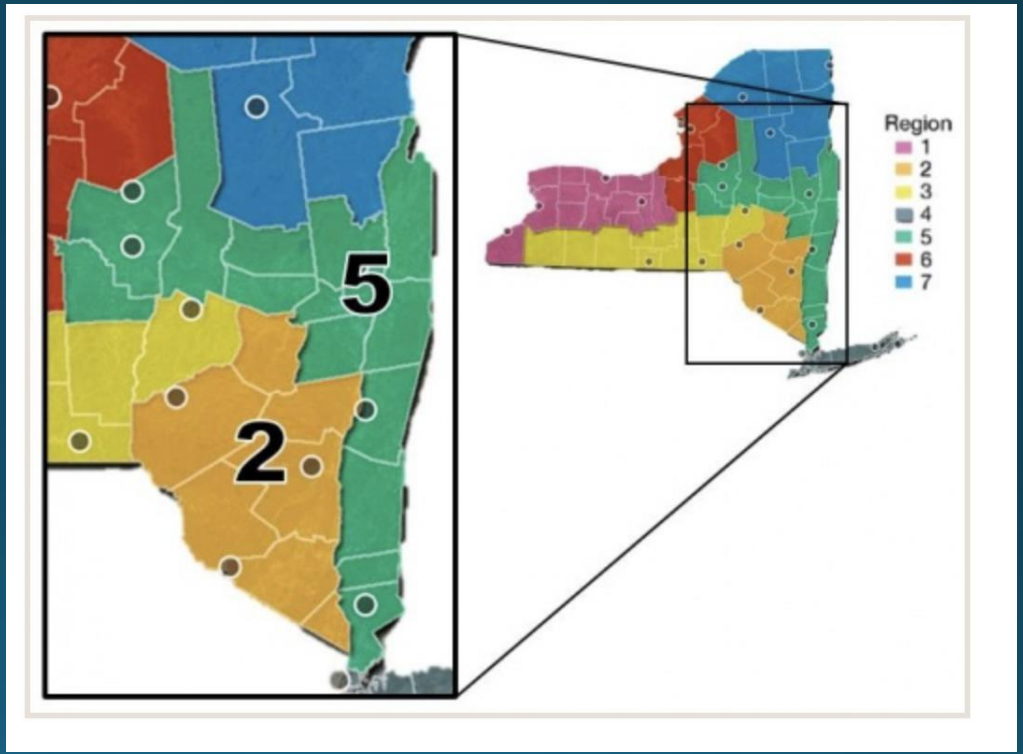
- Sponsored by NYSERDA, the Responding to Climate Change in New York State (ClimAID) Assessment Report was published in 2011
- Climate projections for New York State were updated in 2014
- These climate projections are now codified by the NYSDEC CRRA



Source: NYSERDA

ClimAID Regions

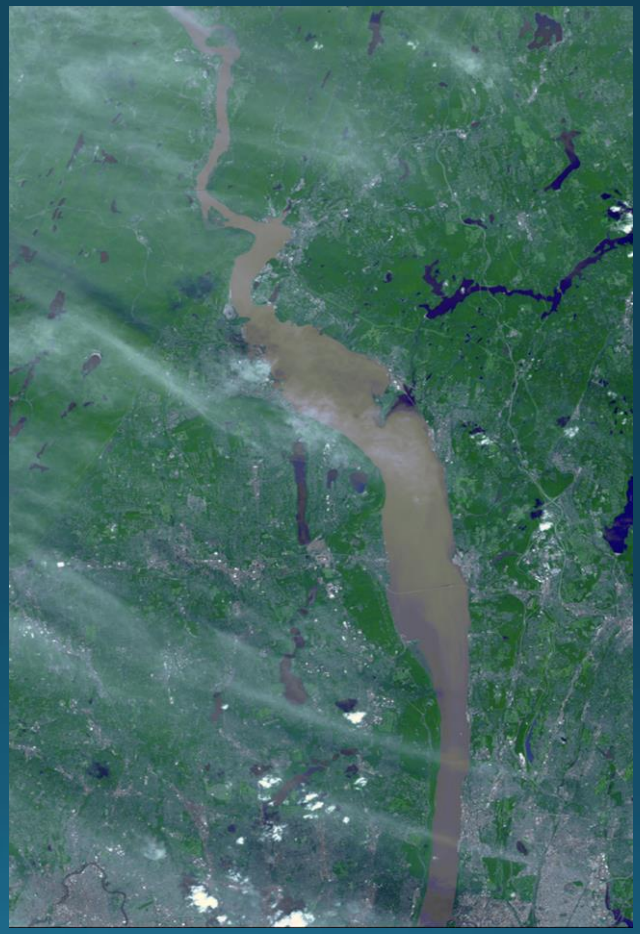
- Regions grouped by similar characteristics including type of climate and ecosystems, watersheds, and dominant types of agricultural and economic activities
- The Hudson Valley spans Region 2 (Catskills/West Hudson) and Region 5 (East Hudson/Mohawk Valley)



Source: NYSERDA

Local Climate Hazards

- Temperature
  - Heat waves, cold snaps
- Precipitation
  - Heavy downpours, snowfall, riverine flooding
- Sea Level Rise
  - Coastal flooding, coastal storms (rainfall and winds)

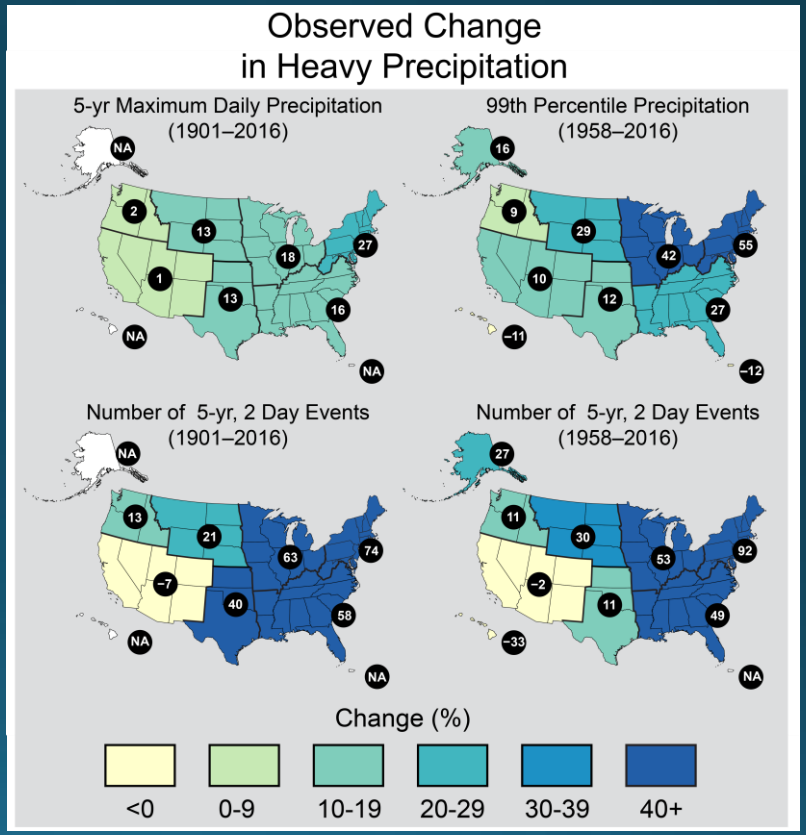


Hudson River Flooding after Hurricane Irene

Source: NASA

Observed Trends – Temperature and Precipitation

- Temperature
  - Temperatures in New York State are rising faster than the national and global average
  - Approximately 2 ° F since 1970, with the greatest warming in winter
- Precipitation
  - Precipitation has become more variable and extreme
  - The Northeast United States has seen the greatest increase in the amount of rain falling in heavy downpour events



Source: USGCRP

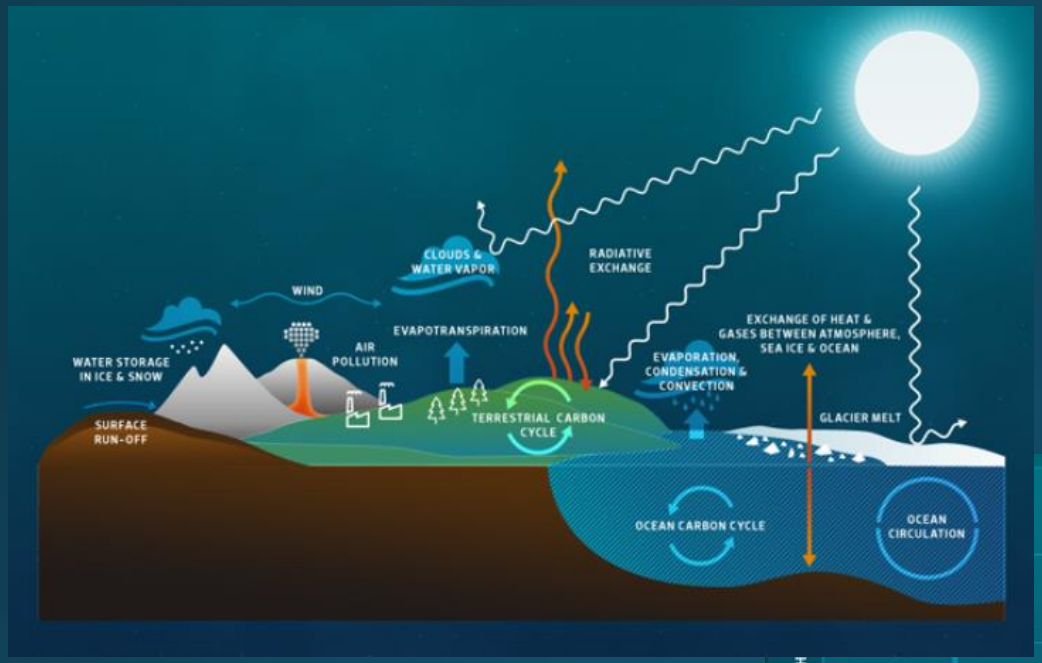
Observed Trends – Sea Level Rise

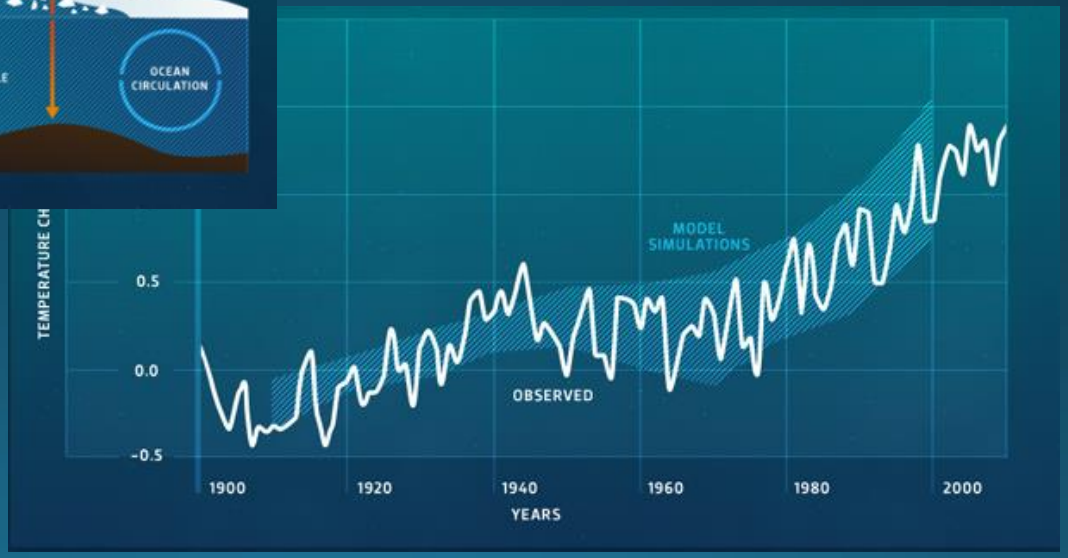
- Sea level
  - For the lower Hudson River, sea levels has increased approximately 1 foot since 1900
  - The rate of sea level rise in the region is faster than the global average
  -
  - In recent years, the rate of sea level rise has increased
  - Primary factors included thermal expansion and loss of land-based ice

Flooding in Stony Point, NY during Hurricane Sandy

Source: NYSDEC

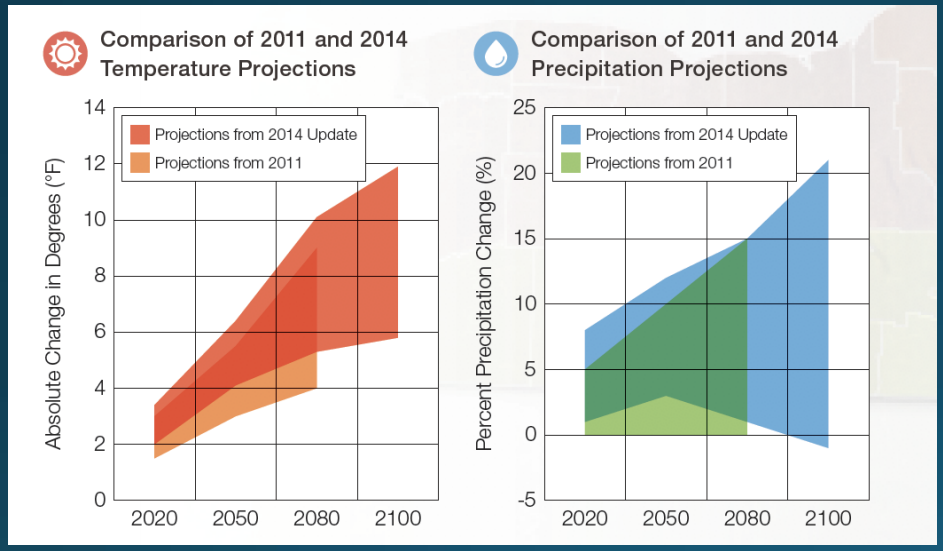
Projecting Future Climate





Powerful computer models let us test and refine hypotheses

Climate Projections for the Hudson River Valley

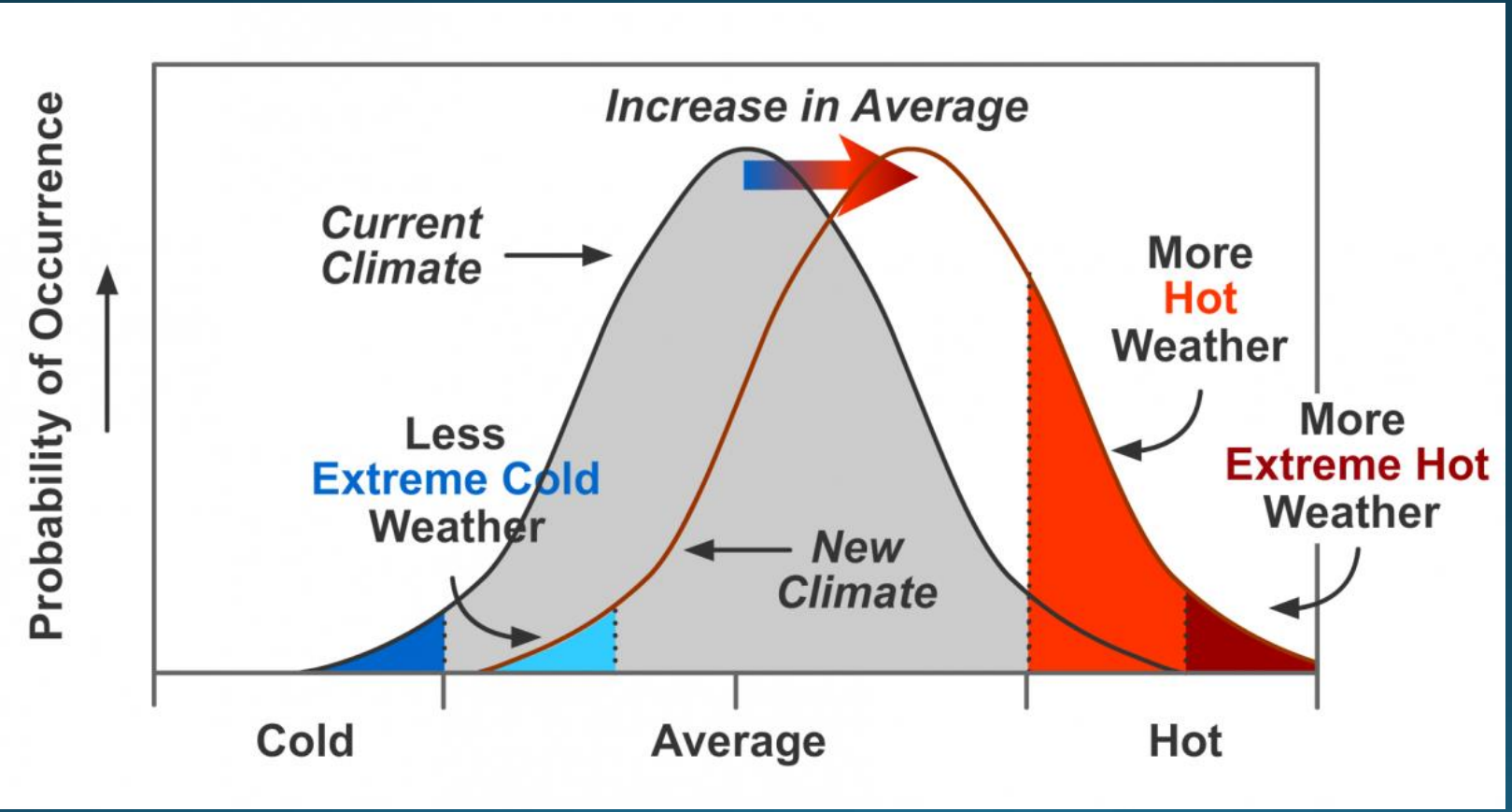


**Refers to the middle range (25th – 75th percentile) of model-based projections*

- **Mean annual temperatures** are projected to **increase** by 4.1 to 5.7°F* by the 2050s and by 5.3 to 8.8°F* by the 2080s.
- **Mean annual precipitation** is projected to **increase** 3 to 12 percent* by the 2050s and 5 to 15 percent* by the 2080s.
- **Frequency of heat waves** is projected to **triple** by the 2080s from 2 to 6 heat waves per year.
- **Sea level** is expected to **rise** 11 to 21 inches* by the 2050s, 18 to 39 inches* by the 2080s, and, for the high estimate, 6 feet by 2100.
- **Increase** in the **frequency and intensity of riverine flooding**

Source: NYSERDA

A small change in the mean . . .



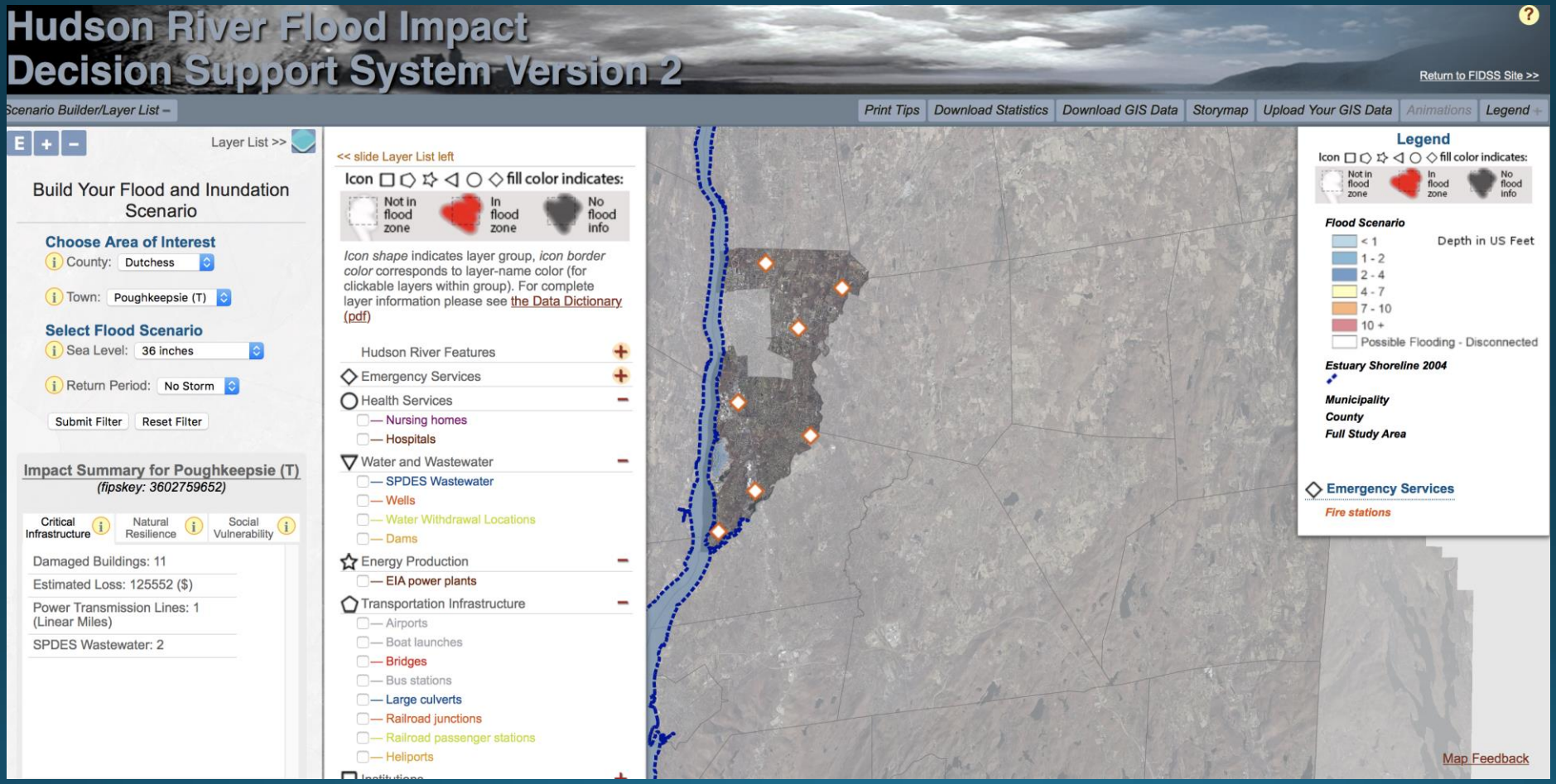
. . . can lead to large changes in extremes

Sea Level Rise Projections

6 NYCRR Part 490, Projected Sea-level Rise. Inches of rise relative to 2000-2004 baseline.

	Region	Long Island					New York City/Lower Hudson					Mid-Hudson				
	Descriptor	Low	Low-Medium	Medium	High-Medium	High	Low	Low-Medium	Medium	High-Medium	High	Low	Low-Medium	Medium	High-Medium	High
Time Interval	2020s	2	4	6	8	10	2	4	6	8	10	1	3	5	7	9
	2050s	8	11	16	21	30	8	11	16	21	30	5	9	14	19	27
	2080s	13	18	29	39	58	13	18	29	39	58	10	14	25	36	54
	2100	15	21	34	47	72	15	22	36	50	75	11	18	32	46	71

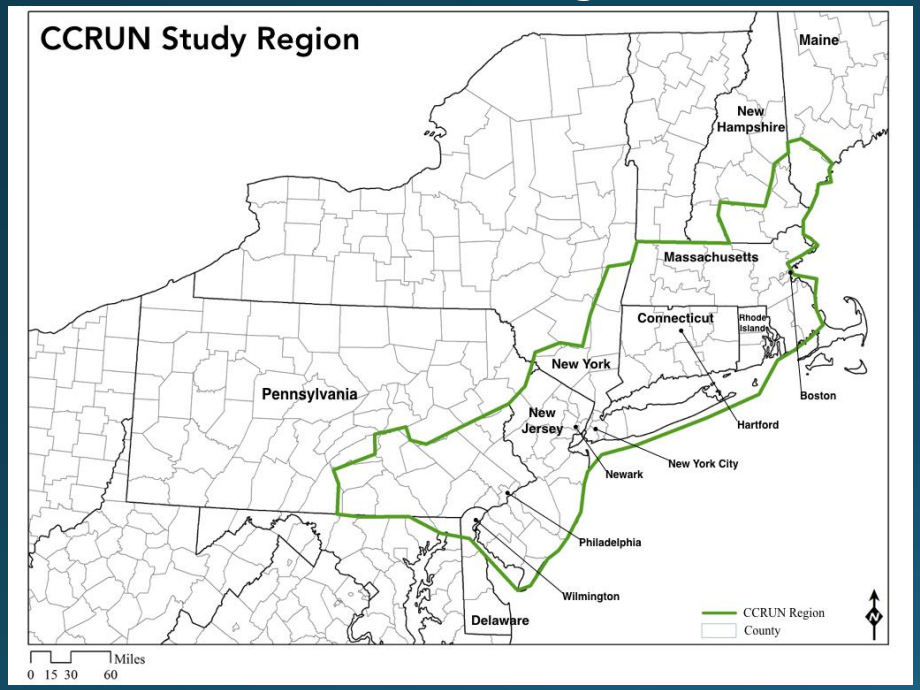
Coastal Flood Mapping Tools



Assessing flood risk and vulnerability in your community

Consortium for Climate Risk in the Urban Northeast (CCRUN)

The only RISA team with principal focus on urban settings



CCRUN geographic domain defined by metropolitan area counties

A partnership of six universities

Columbia University in the City of New York

Drexel University

Hunter The City University of New York

Stevens Institute of Technology — The Innovation University — 1870

University of Massachusetts Amherst

Boston University

CCRUN

NOAA RISA Regional Integrated Sciences and Assessments