Continued Stakeholder Engagement and Discussions on Climate Resilience

Public Service Law (PSL) § 66(29) – PSC Case 22-E-0222

For the O&R Climate Resilience Working Group

March 26, 2025

AGENDA

- Overview of the PSC's December 2024 Order in Case 22-E-0222
- Update on recent O&R climate resilience activities
- O&R’s revised Climate Change Resilience Plan (CCRP) investments
- Engagement with telecommunications service providers
- Resilience Spotlight: Enhanced Overhead Cable Systems
- Next Steps

CASE 22-E-0222

Overview of the PSC's December 2024 Order

- The Joint Utilities (JU) CCRPs generally satisfied the requirements of PSL 66(29) with modifications to be filed within 60 days (February 18, 2025)
  - PSC directed the JU to remove projects that were improperly classified as climate change driven resiliency projects
  - The cost, timing, and priority of all climate change resilience plan investments will be addressed in ongoing and future rate proceedings
  - CCRP appropriately provided the first five-year costs, bill impacts, and implementation schedules
- PSC finds no disproportionate burden on DACs resulting from the JU's CCRPs
- PSC directed the JU to continue working with their respective working groups and incorporate telecommunications service providers

Overview of the December 19, 2024 PSC Order

- O&R will implement the proposed resilience investments included in its Joint Proposal (filed on November 8, 2024) which the PSC adopted in O&R's rate case proceeding on March 20, 2025
  - O&R will file biennial reports on the progress, expenditures and implementation of the CCRP
- The Order sets November 21, 2028 as the due date for the next iteration of the CCRP
  - Subsequent plans should incorporate feedback from the PSC

The PSC provided feedback for future iterations of O&R's CCRP:

- Include projections to address impacts of wind and ice accumulation on aerial cables and equipment
- Incorporate more defined processes, planning, and design changes with respect to climate change projections
- Include refined performance metrics and quantitative analysis of resilience benefits and costs
- Provide analysis of forecasted outage reductions from implementing resilience measures
- Define engagement strategies for proposed resilience measures that could impact telecommunication service providers and discuss opportunities for coordination

O&R's recent climate resilience activities

- O&R filed its modified CCRP on February 18, 2025
  - Of the 13 projects proposed, the PSC approved 8 as climate resilience
  - O&R updated the 5-, 10-, and 20-year funding projections and revised the rate case revenue requirement and climate resilience bill impacts to align with the "approved" resilience investments
    - 5-Year (2025-2029): $184.1 million
    - 10-year (2025-2034): $358.0 million
    - 20-Year (2025-2044): $900.4 million
  - All reclassified investments were included in O&R's approved rate request for 2025-27
  - O&R updated the ORU.com/Resilience webpage with the updated version and two-page summary
- O&R has initiated conversations with regional telecommunications providers on climate resilience
- O&R is continuing its flood modeling study and will provide an update at the next Working Group meeting

O&R revised CCRP climate resilience investments

From 2025 – 2029, O&R has proposed to invest $184 million in climate resilience investments* to prevent and mitigate climate change impacts. O&R's multi-pronged strategy continues to be Prevent, Mitigate and Respond.

Projects/Programs	Strategy	2025 – 2029 Total (in $000s)*
Selective Undergrounding	Prevent	$89,900
Overhead Line Reinforcement	Prevent	$30,400
Incremental Hazardous Tree Removal Program	Prevent	$0**
Shoreline Erosion Protection	Prevent	$5,900
Substation Flood Protection	Prevent/Mitigate	$13,800
Distribution Automation / Smart Grid Program	Mitigate	$44,000
Total Proposed Investments		**$184,100**

*Subject to approval by the NYSPSC in regular rate case proceedings

**Incremental funding request for additional hazard tree removal was not approved in the rate case proceeding and program to continue at existing budgeted funding levels

These proposed items are not appropriately classified as climate change resilience investments and instead fall under existing capital program categories: Line 705 Transmission Project, Transmission Overhead Structure Replacement Program, Micronet Weather Station Program, Storm Material Management Program, Emergency Response and Control Facility, Storm Resilience Center

Engagement with telecommunications service providers

- Per the PSC's December 2024 Order in Case 22-E-0222:
  - Utilities to include telecommunication service providers in their climate resilience working groups
  - Utilities must define their engagement strategies for proposed resilience measures that could impact telecommunication providers and offer opportunities for coordination with these providers
- Initial meeting held on March 13, 2025:
  - Introduced resilience teams and established lines of communication
  - Informed of each team's climate resilience strategies, efforts, and challenges
  - Identified opportunities for continued engagement
  - Invited to join O&R's Climate Resilience Working Group

The following telecommunications service providers operate in the O&R service territory:

- Altice
- AT&T
- Charter Communications
- Frontier Communications
- T-Mobile
- Verizon
- Warwick Valley Telephone

Representatives from each company have been invited to O&R's Climate Resilience Working Group.

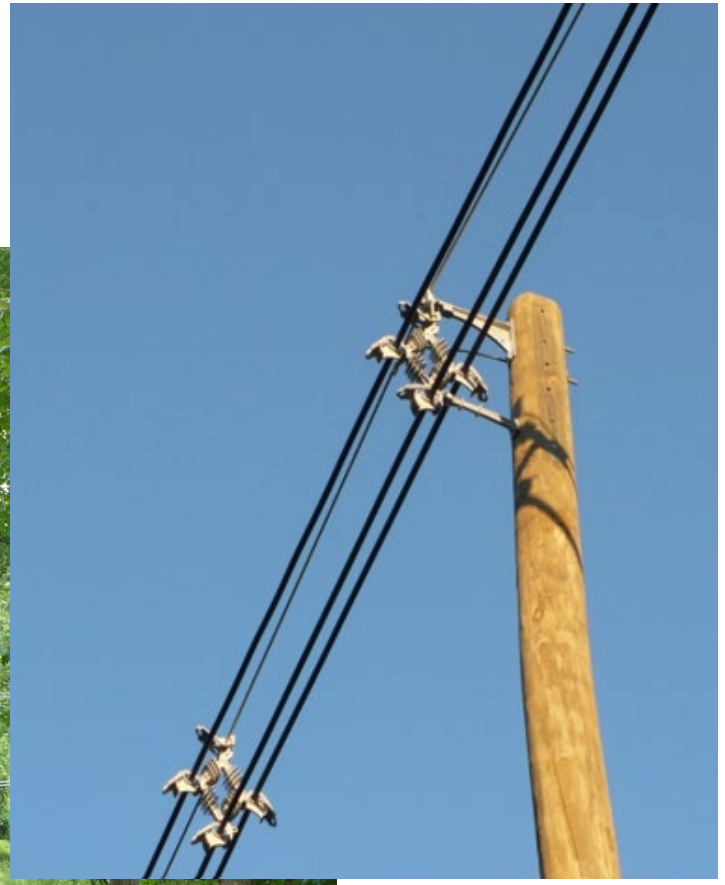
Resilience Spotlight: Enhanced Overhead Cable Systems

Tom Brown
Chief Engineer – Transmission & Distribution Planning

RESILIENCE SPOTLIGHT

Enhanced Overhead Cable Systems

- Spacer Cable Systems
  - Higher mechanical strength
  - Multiple layer covered conductors
  - Compact design
  - Enhanced lightning protection



RESILIENCE SPOTLIGHT

Enhanced Overhead Cable Systems

Next Steps

- O&R will continue flood modeling study with Dewberry
- O&R will continue to provide climate resilience updates to the Working Group
- O&R will continue to seek collaborative opportunities to conduct additional studies and research
- O&R will continue to seek federal and other funding opportunities as appropriate

Orange & Rockland

Continued Stakeholder Engagement and Discussions on Climate Resilience

Public Service Law (PSL) § 66(29) – PSC Case 22-E-0222

For the O&R Climate Resilience Working Group

November 12, 2025

AGENDA

- Overview of the O&R Climate Resilience Working Group and recent resilience activities
- NYSERDA Climate Resilience Update
- Deluge Flood Modeling Study Update
- Resilience Spotlight: Shoreline Erosion Protection Program
- Next Steps

Climate Resilience Working Group Overview

Our stakeholder engagement effort is designed to provide transparency on the climate study process and outcomes and collect stakeholder input.

- Orange & Rockland will schedule and conduct working group meetings a minimum of twice annually in accordance with PSL §66(29)
- Communicate with the stakeholders of Orange & Rockland's Climate Study and Resilience Plan efforts and progress
  - Share available climate science and anticipated weather conditions
  - Understand the physical impacts of climate change on Orange & Rockland's infrastructure and how resilience measures are being implemented to address impacts
  - Provide updates on progress of implementation of O&R's Climate Change Resilience Plan
- Working Group to provide feedback on O&R's Climate Change Resilience Plan which will be filed every 5 years

Climate Resilience Working Group Overview

- O&R's Climate Change Study and Resilience Plans can be viewed on our webpage
  - Link: Our Climate Change Resiliency Plan | Orange & Rockland
- Please contact ResilientGrid@oru.com to be added to the distribution list
- Working group members comprise of the following stakeholders:
  - New York State Department of Public Service
  - New York Independent System Operator
  - New York State Research and Development Authority
  - New York Power Authority
  - Telecommunications Service Providers
  - Orange, Rockland and Sullivan County representatives
  - Municipal and local government representatives
  - Environmental advocacy organizations

Orange & Rockland's recent climate resilience activities

- We are implementing resilience investments as part of our approved Climate Change Resilience Plan filed in February 2025
- We continue to assess inland flooding risk from extreme rainfall events from our most recent modeling study with Con Edison
- O&R submitted letter of supports to research proposals responding to NYSERDA's Climate Impact and Adaptation Research PON 6034
- We continue to seek collaborative opportunities to conduct additional studies and research and federal and other funding opportunities as appropriate

Timeline

2025
- Filed updated/approved Climate Change Resilience Plan (CCRP)
- Begin implementation of projects approved in O&R's Climate Change Resilience Plan
- Conduct supplementary deluge rainfall and flood modeling study

2026
- Continue to streamline performance reporting and incorporate metrics to quantify resilience benefits
- Collaborate on supplementary studies as opportunities arise

2027
- Prepare and file first biennial report on status of CCRP implementation

2028
- File updated CCRP (due every 5 years)

NYSERDA Resilience Update

Amanda Stevens

Senior Project Manager, NYSERDA Environmental Research

O&R Climate Resilience Working Group

November 12, 2025

Agenda

- Environmental Research Program planning
- Research solicitation
- NYS Adaptation and Resilience Plan

What is ERP?
(Energy-Focused Environmental Research)

Advance understanding of environmental and public health impacts of energy choices to inform equitable and effective energy-related policies.

Air Quality and Health Effects
Studies on atmospheric trends, source apportionment and health effects of energy-related emissions (Particulate Matter, Ozone, co-pollutants)

Climate Impacts and Adaptation Studies
Forward looking climate information, impact assessments, and research on NY climate adaptation

Ecosystem Response to Atmospheric Deposition
Studies and long-term monitoring associated with deposition of Sulfur, Nitrogen and Mercury on NY ecosystems and wildlife

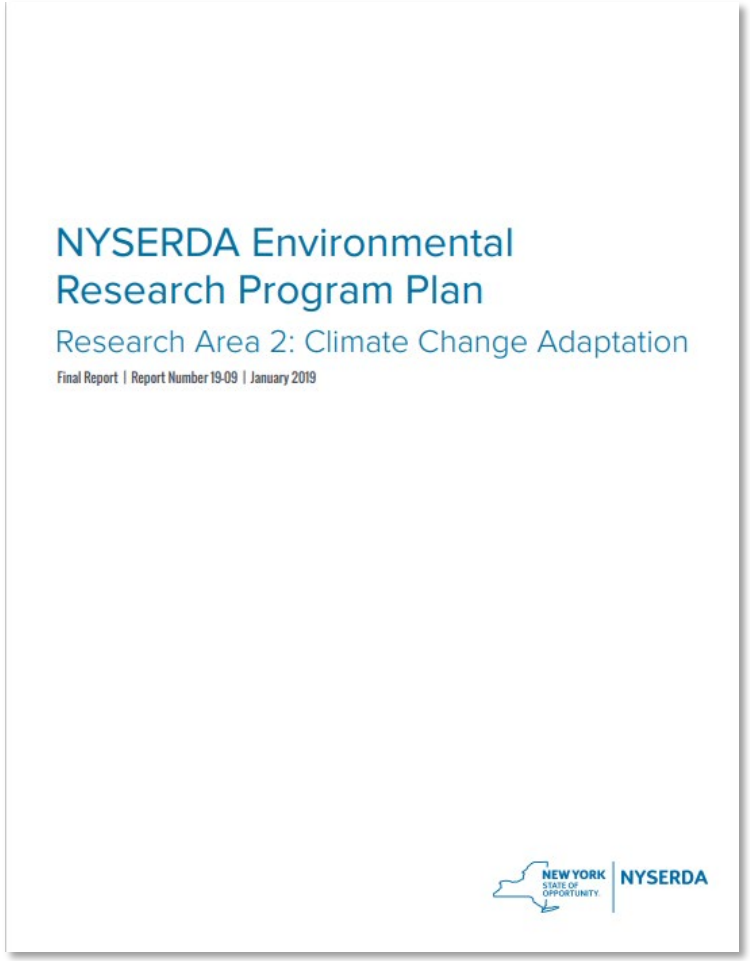
Fossil Fuel and Biomass Combustion
Studies on greenhouse gas and co-pollutants from heating and electric generation systems

Greenhouse Gas Emissions and Mitigation
Research and monitoring to characterize methane and other greenhouse gas emissions sources and sinks

Offshore Renewable Energy and Transmission
Environmental and fisheries research, assessments and co-utilization opportunities at offshore energy sites

Onshore Renewable Energy and Storage
Environmental, community and agricultural effects of land-based renewable energy deployment

Adaptation Focus Area & Research Plan



Last published in 2019

Aiming to update by early 2026

- Individual agency and organization conversations
- Gap analysis: Extreme Heat Action Plan, NYS Climate Impacts Assessment, Climate Act, etc.
- Request for Information

https://www.nyserda.ny.gov/All-Programs/Environmental-Research/Research-Planning

RFI Responses | Example Topics Identified

Category	Description
Critical Infrastructure	*Understand or address risks to critical infrastructure and cascading impacts on communities*
Flood Modeling & Projections	*New or improved flood modeling for current and future conditions*
Benefit Cost Analysis (BCA)	*Weigh the benefits of adaptation actions to their cost, including those that cannot be easily monetized*
Nature Based Solutions & Green Infrastructure (NBS & GI)	*Research, guidance, case studies, policies for nature-based solutions and green infrastructure*
Equity & Justice	*Better understand or address disproportionate impacts to marginalized and underserved communities and groups*
Decision Making Under Deep Uncertainty (DMDU)	*Managing climate-related uncertainty through robust, adaptive decision making (e.g., scenario planning)*

Climate Impacts and Adaptation Research Solicitation

A. Gap analysis for underreported vulnerable populations
B. Data and information gaps for indoor air quality and climate change
C. Compound events
D. Advancing the development of ice, wind, and deluge projections

Adaptation and
Resilience Plan

New York State Adaptation and Resilience Plan

Background & Context

NYS Adaptation and Resilience Plan (NYSARP)

NEW YORK STATE | Department of Environmental Conservation

NEW YORK STATE | NYSERDA

NEW YORK STATE | Department of State

NEW YORK STATE | Homeland Security and Emergency Services

Press Release: https://www.governor.ny.gov/news/during-earth-week-governor-hochul-announces-launch-statewide-climate-adaptation-and-resilience

Climate Resilience & Adaptation Planning in NYS

This multi-agency plan will establish a unified vision to adapt and prepare New York communities for extreme weather

Climate Impacts Assessment (NYSERDA)	Scoping Plan Adaptation & Resilience Chapter (Multi-agency)	Extreme Heat Action Plan (NYSERDA & DEC)	State Hazard & Local Mitigation Plans (DHSES)
Community Risk and Resiliency Act (Statewide)	NYS Coastal Management Program (DOS)	Climate Smart Communities Program and Grants (Multi-agency; DEC)	Smart Growth Countywide Resiliency Planning (DOS)
Resilient NY (DEC)	DOS Resilience Principles (DOS)	State Energy Plan – Resilience Chapter (NYSERDA)	And more…

NYSARP Approach

NYSARP Process and Development

NYS is leading a phased approach to develop a comprehensive **New York State Adaptation and Resilience Plan (NYSARP)**.

Foundational Phase

April 2025 – Summer 2026

- Analyze existing NYS adaptation and resilience planning efforts to unify efforts and identify gaps.
- Engage with key audiences to validate identified gaps and inform the final Framework.
- Publish the **NYSARP Framework** and look ahead to implementation phase.
  - *Framework elements are discussed on the next slide.*

Implementation Phase

Starting Summer 2026

- Implement actions identified in the Framework in collaboration with NYS agencies and partners.
- Develop resources in alignment with gaps identified and the Framework developed in the Foundational Phase.

NEW YORK STATE | Department of Environmental Conservation

NEW YORK STATE | NYSERDA

NEW YORK STATE | Department of State

NEW YORK STATE | Homeland Security and Emergency Services

NYSARP Framework

A clearly articulated, unifying **vision** for New York State adaptation and resilience efforts.

A set of **principles** that reinforce a comprehensive and equitable approach and ground current and future efforts.

Available **resources** that enhance existing and advance future initiatives (at the state or local level) and **supportive guidance** on how to use the vision and principles to advance your work.

Early, high-impact actions the State can take to address climate vulnerabilities and build a foundation for collaboration at the local level.

NYSARP Framework Engagement

NYS State Agencies

- Develop Framework elements
- Evaluate planning efforts to strengthen collaboration and identify new opportunities
-Share immediately available resources

Local Governments; Partners; CBOs

- Inform Framework elements
- Help identify needs and opportunities of local and community partners
- Help raise awareness about NYSARP and the Framework development process

New Yorkers

- Provide feedback on Framework elements
- Participate in engagement webinars as interested

Foundational Phase Engagement Milestones

The NYSARP development process will be informed by State agencies, local governments, community advocates, adaptation and resilience experts, and the public. Please note that this timeline is tentative and subject to change.

April 2025: Project Kickoff

New York State agencies met to formally begin the Framework development process.

Summer 2025: Public Webinars

State agencies hold a series of public webinars showcasing immediately-available adaptation & resilience resources.

Winter 2026: Public Comment

The State will make the draft Framework available for public comment and hold additional virtual engagement opportunities.

Summer 2026: Framework Publication

The NYSARP Framework is released to the public, initiating Phase 2 (Implementation).

Ongoing targeted engagement will include two advisory panels (focused on Climate Equity, and Local Partners) and focus groups to solicit input from key constituencies

Stay Up to Date!

To stay up to date with NYSARP progress, please subscribe to the NYSDEC mailing list, or check the Plan's website.

NYSARP Updates:

Sign up for NYSARP email updates: https://public.govdelivery.com/accounts/NYSDEC/subscriber/topics
(*check the box for "Climate Adaptation and Resilience Plan*")

Contact: NYSAdaptPlan@dec.ny.gov

NYSARP Website:

Deluge Flood Modeling Study Update

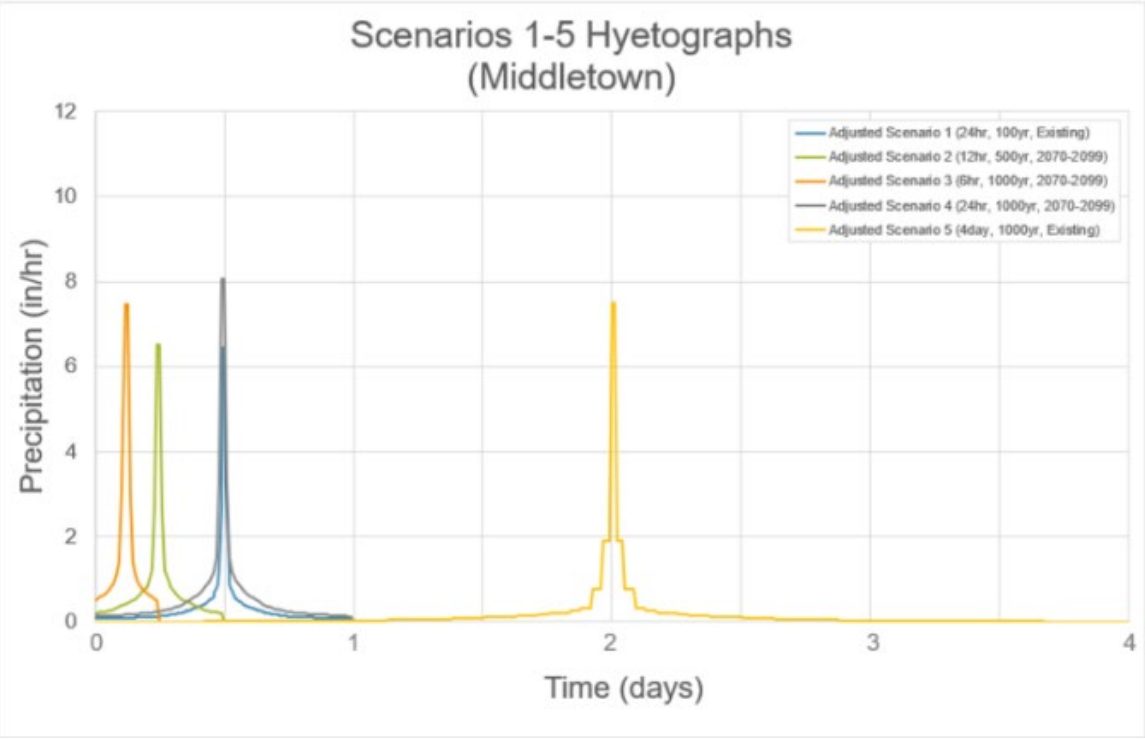
Alfred Lim

Project Specialist, Orange & Rockland

Overall objectives of the study

- Orange and Rockland and Con Edison contracted Dewberry Engineering to model the impact of deluge rain events using climate projections with **Hydrologic** and **Hydraulic (H&H) Modeling**
- We modeled 5 different rainfall scenarios based on the plausibility of the event (e.g., return period, potential peak intensity, recent storm data, etc.) and with the current Intensity Duration Frequency (IDF) curves published by Cornell

#	Climate Conditions	Scenario Goal
1	24-hr, 100-yr return period	Simulate existing conditions and recent events (e.g., Post-Ida remnants)
2	2070+ Time Period: 12-hr, 500-yr return period	Simulate flash floods for both future 6- and 12-hour durations with future climate conditions (e.g., Hurricane Irene August 2011, Hudson Valley July 2023 event)
3	2070+: 6-hr, 1000-yr return period	
4	2070+: 24-hr, 1000-yr return period	Provide a future worst-case scenario using a stalled tropical storm with future climate conditions (e.g., Hurricane Harvey)
5	Current PMP[1]: 4-day, 1000-yr return period	Simulate dual-band or compound event over multiple days (e.g., increased runoff, longer peak intensity)



[1]Probable Maximum Precipitation

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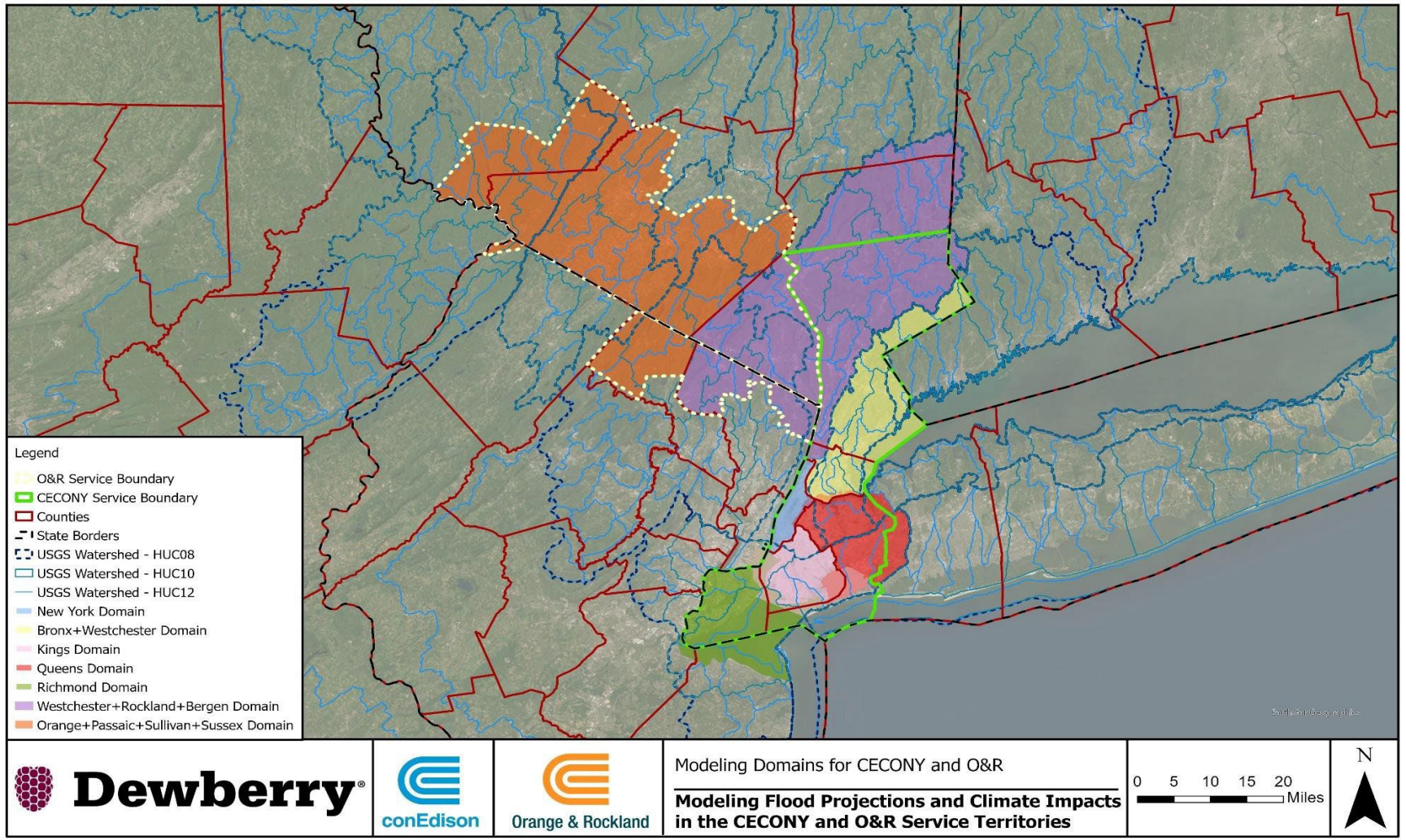
Modeling domain overview

The CECONY & ORU service territories were broken down into 7 modeling domains to simulate and visualize extreme rainfall conditions

O&R Domains	Area (mi^2)
Rockland + Bergen Counties *+ portion of Westchester County (CECONY)*	880
Orange County + portions of Sullivan + Passaic Counties	950

CECONY Domains	Area (mi^2)
Staten Island (Richmond County)	220
Queens Borough (Queens County)	130
Brooklyn Borough (Kings County)	70
Manhattan + Islands	20
Bronx + portion of Westchester County	200



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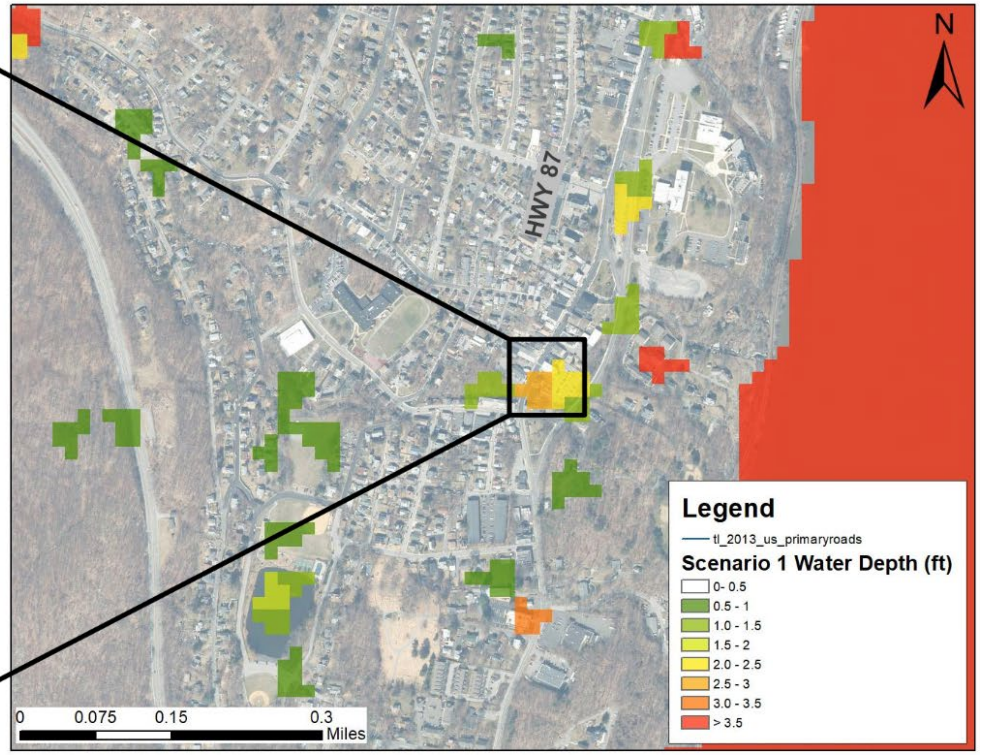
Flood model validation

For qualitative validation of our modeling efforts, we reviewed locations that experienced flooding from prior extreme rainfall events with pictures from public data sources.

Observed flooding on Main Street in Highland Falls in Orange County on 7/9/2023

Model results

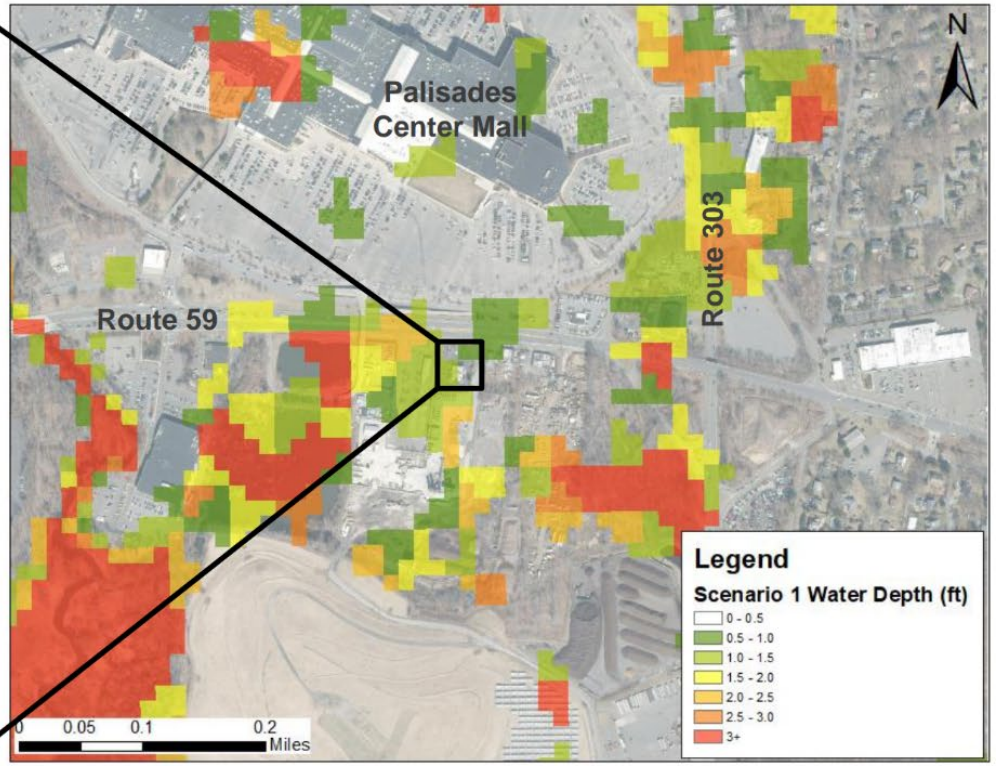


Flood model validation

For qualitative validation of our modeling efforts, we reviewed locations that experienced flooding from prior extreme rainfall events with pictures from public data sources.

Observed flooding on Route 59 in West Nyack in Rockland County on 3/6/2011

Model results



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Next Steps for study

- Our initial observations show that some company locations could be vulnerable to future extreme rainfall
- After completing this study, further review is needed to assess flood risk tolerances with internal engineering and planning groups
- As the intensity and frequency of experienced extreme rainfall increases, we will continue to apply a flexible and adaptive approach to mitigate impacts

Resilience Spotlight: Shoreline Erosion Protection Program

Jim Heady

Chief Engineer, Orange & Rockland

Transmission Shoreline Program

- Over time the shoreline of waterways near our transmission structures have eroded impacting the stability of some structures.
- O&R conducts annual inspections of these structures and is restoring structures identified as being deficient as part of our Capital Improvement Program.
- Initial structures identified in 2007 and restored in 2008. Subsequent structures identified in 2009 and then after Hurricane Irene in August 2011 and Superstorm Sandy in 2012.
- After Hurricane Irene in August 2011 and Superstorm Sandy in 2012, Engineering concluded that a system wide assessment of transmission structures should be conducted and all locations adjacent to bodies of water with some evidence of erosion were identified.
- System wide inspection completed in 2013. Subsequent inspections completed after significant rainfall, approximately 10–25-year rainfall events.
- Starting in 2017, entire system inspected by T&S Engineering on an annual basis, March-April of each year.
- Starting in 2025, inspection expanded to include structures located within the FEMA 500-year flood plan.

Transmission Shoreline Inspection Program

- Shoreline inspections are prioritized as follows:
  - Priority I – Repair as soon as possible, but no longer than one week
  - Priority II – Repair within one year
  - Priority III – Repair Within three years
  - Priority IV – Condition found but repairs not required and do not require repair within a five year timeframe, continue monitoring
  - Not Rated – No condition found
- Structures identified as Priority I thru IV are inspected annually. Structures Not Rated are inspected every 5 years. Approximately 85 structures inspected annually over the last 5 years.
- Inspections completed in 2025:
  - Regular Program - 83 Structures
  - FEMA Floodplain - 152 Structures
- Additional structures to be inspected in Q4 (using a drone) – 16

Shoreline Restoration Project – Line 98 Complete

- **Shoreline Armoring and Restoration Complete**
- **Monitoring for Soil Stabilization Required As Part of SWPPP Close Out**

Pole 46 & Pole 50

2025 Shoreline Inspections

Lines 51/65, Tower 9

2025 Shoreline Inspections

Line 311, Pole 206

2025 Shoreline Inspections Using A Drone

Lines 45/658

Next Steps

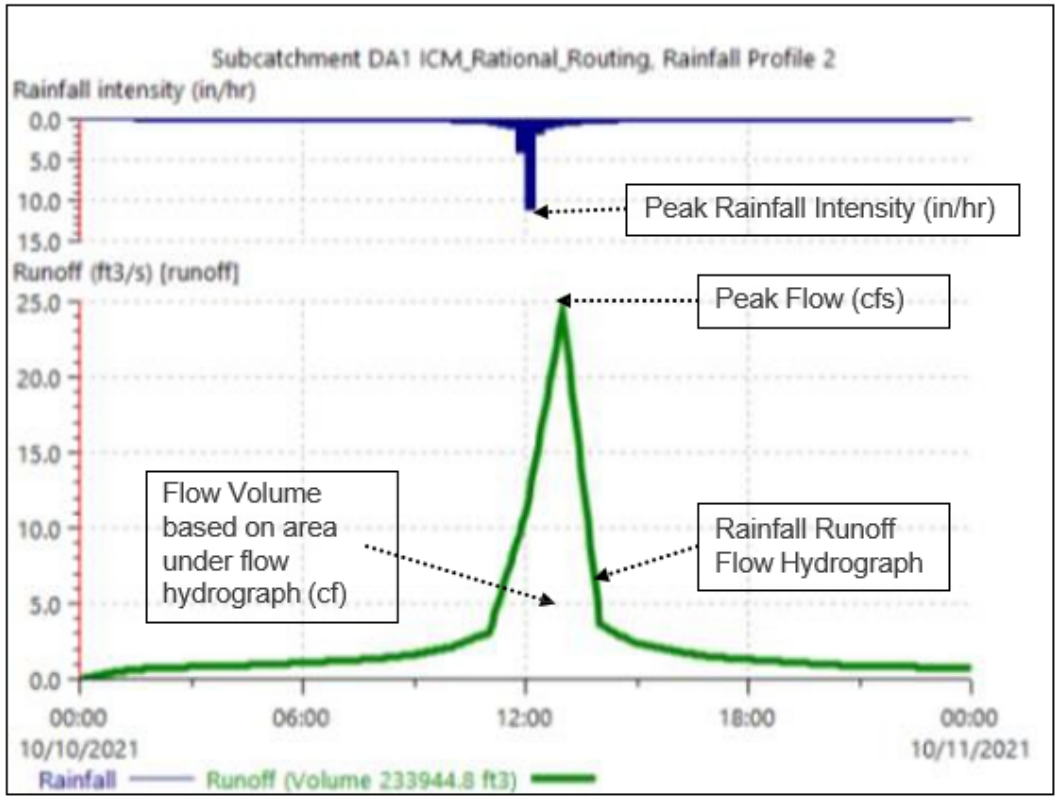
- We will continue to provide climate resilience updates to the Working Group
- We are open to collaborating with NYSERDA and other organizations to conduct additional studies and research to inform our next Resilience Plan filing
- We expect our next Working Group meeting to be scheduled in early 2026
- We expect to file the first Biennial Report on the progress, expenditures and implementation of the Resilience Plan on December 1, 2027

Appendix

FOR REFERENCE

Hydrology and hydraulics (H&H) basics

- **Hydrology:**
  - Calculates quantity of water (runoff) and peak flow rate generated during a rainfall event (e.g., cubic feet per second)
- **Hydraulics:**
  - Determines how water moves through a system (over land, piping, rivers), depth of water, elevation of water height, and velocity
  - Includes physical representation of conveyance system (river channel cross-sections; hydraulic structures like dams; drainage systems like inlets, etc.)
- **Key Items in Rainfall Hyetograph***
  - Peak Intensity (in/hr): likely the main reason for flash flooding
  - Total Rainfall Depth (inches) is total rainfall that fell during the event
  - Rainfall Duration (hours) represents length of storm



*Ground saturation influences both hydrological processes and hydraulic properties, and this modeling used USGS groundcover data as an input