RESILIENT
NORTHEASTERN NEW JERSEY

CLIMATE HAZARD RESILIENCE TOOLBOX

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There are many possible solutions that can be implemented to address climate-related hazards considered by Resilient NENJ (see the Climate Hazards Assessment for more information on these hazards).

Resilient NENJ developed this climate hazard-related toolbox that describes solutions included in the five categories in the Resilient NENJ Action Plan: physical and nature-based solutions; policy and governance solutions; outreach, education, and capacity building; service and program development or enhancement; and emergency preparedness and response.

The toolbox is not intended to be inclusive of all possible solutions; it helps communicate the types and range of solutions possible. The related Flood Resilience Toolbox is included in Appendix C of Resilient NENJ's Vision and Priorities report and is available as a stand-alone document on the Resilient NENJ website.

The toolbox helped the team identify solutions used in the development of the scenarios outlined in Resilient NENJ's Scenario Development Report and for advancement into the Action Plan. The toolbox summarizes key information about each solution including:

- A description of the tool
- Existing example applications of the tool
- Types of hazards the tool addresses
- Scale of the intervention (individual site, multiple sites, etc.)
- Possible co-benefits (benefits other than reduced flooding)

Legend

Hazards

- Extreme Heat
- Air Quality
- Drought & Water Supply
- Wildfire Risk
- Groundwater Rise & Quality
- Severe Weather
- Ocean Acidification
- Vector-Borne Illness

Co-Benefits

EDUCATIONAL ECONOMIC RECREATIONAL ECOLOGICAL

Level of Effort

Scale of Implementation

Site-Specific Neighborhood Municipality

Region State

OUTREACH, EDUCATION, AND CAPACITY BUILDING

Action – Develop and Distribute Accessible Information & Educational Materials

Tools

Multilingual outreach and education campaign designed to reach as many communities as possible (especially environmental justice communities) focused on public health risks and mitigation options associated with:

- Extreme Heat
- Air Quality
- Lyme Disease Protection
- West Nile Virus Protection
- Groundwater Rise & Quality
- Severe Weather
- Ocean Acidification

- Start a drought response outreach program with detailed guidelines (e.g., California Drought Response Outreach Program for Schools (DROPS))

Examples of Ongoing Efforts

- The NJ Water Savers program supports comprehensive public education about water conservation, efficient landscaping and irrigation practices, home water audits and indoor water saving techniques, and appropriate school curricula materials
- The New Jersey Watershed Ambassadors Program is a community-oriented AmeriCorps program that raises awareness on water-related issues

Scale of Implementation

- Neighborhood
- Municipality
- Region
- State

Co-Benefits

- EDUCATIONAL

OUTREACH, EDUCATION, AND CAPACITY BUILDING

Action – Invest in Community Engagement to Understand Local Needs

Tools

- Implement a public health hotline system for extreme heat to alert public health officials of high-risk or distressed individuals, tied to public programs to assist with residential heat mitigation
- Invest in comprehensive community engagement to understand where long-term and “invisible” health effects of pollution are already taking effect. Based on this, identify high-priority areas for immediate intervention
- Host the National Weather Service SKYWARN Storm Spotter training
- Work with teachers to help educate children on the risks of severe weather
- Determine areas high in Lyme contraction and convert them into “tickscapes,” areas less livable for tick communities, while accounting for potential negative ecological, stormwater, or urban heat island side effects. Some options to explore include keeping areas mowed and trimmed at edges, repairing stone walls and sealing cracks, keeping firewood piles away from frequently traveled areas, and using mulch or stone to create borders
- Conduct community engagement to increase awareness of localized social and economic impacts of:
  - Ocean Acidification
  - Changes to Water Supply Levels and Projected Future Demand

Examples of Ongoing Efforts

- The NJDEP Office of Environmental Justice runs the Community Collaborative Initiative (CCI), a place-based partnership that works closely with local communities on a variety of environmental issues.

Scale of Implementation

Neighborhood | Municipality | Region | State

Co-Benefits

EDUCATIONAL

OUTREACH, EDUCATION, AND CAPACITY BUILDING

Action – Build Partnerships & Establish Working Groups for Collective Action

Tools

- Establish municipal-level working groups to advance specific actions related to:
  - Extreme Heat and Urban Heat Islands
  - Ground Ozone/Aerosol Health Risks
- Partner with the American Water Works Association (AWWA) to explore statewide industry-standard approaches to water conservation
- Engage communities in the National Groundwater Monitoring Network to maintain and better understand groundwater systems
- Build partnerships with the research and academic community to support statewide ocean acidification initiatives
- Coordinate training within communities to create a local career-pipeline for foresters and fire management workers

Scale of Implementation

Neighborhood | Municipality | Region | State

Co-Benefits

EDUCATIONAL

Examples of Ongoing Efforts

- New Jersey Sea Grant and NOAA Ocean Acidification Program (OAP) partnership prioritizes and invests in regional ocean/coastal acidification research
- The Southward Environmental Alliance will host its 2nd Environmental Justice Summit where local community members and officials have panels and discuss various important environmental challenges

PHYSICAL AND NATURE BASED SOLUTIONS

Action – Invest in Ecosystem-Based Adaptation Projects to Address Multiple Climate Hazards

Tools

Expand urban green space to:

- Address environmental justice issues
- Improve community health

Decrease Surface Temperatures

Ameliorate Poor Air Quality

Mitigate Flash Flooding

Large-scale forest stand improvement (FSI) projects including enhancing native habitats, removal of additional brush/debris/dead leaves, tick tubes, and monitored localized burnings

Minimize Tick Presence & Remove Invasive Species

Reduce Wildfire Fuel and Increase Forest Health

Scale of Implementation

Neighborhood

Municipality

Region

State

Implement watershed-based management habitat restoration, sustainable agroforestry practices, and planting of native species to:

Protect Water Resources, Improve Groundwater Recharge and Quality

Decrease Forest Fire Risk

Implement integrated water resources management (IWRM) practices in future water supply infrastructure, such as conjunctive seasonal use of surface water and groundwater

Maintain surface water wetlands and lakes to decrease contaminated recharge

Large-scale projects and initiatives to conserve and protect marine life vulnerable to ocean acidification

Co-Benefits

EDUCATIONAL

RECREATIONAL

ECOLOGICAL

Examples of Ongoing Efforts

- NJ National Resources Conservation Service (NRCS) offers financial and technical assistance to landowners for FSI projects
- NJDEP Green Acres Program conducts land acquisitions as well as loans/ grants to nonprofits for acquisition and conservation purposes
- Hudson County Urban Forestry Initiative
- Jersey City Tree Canopy Assessment – Urban Environmental Green Infrastructure Design Plan
- Hoboken Green Infrastructure Strategic Plan
- The City of Newark's Adopt a Catch Basin Program can help clear standing water that serve as mosquito breeding grounds

PHYSICAL AND NATURE BASED SOLUTIONS

Action – Site-Specific Plans for Prioritized Aging Infrastructure and Hazardous Sites

Tools

- Conduct a comprehensive vulnerability assessment of:
  - Electrical, Transportation, Water, and Conveyance Infrastructure to Heat Stress
  - Water Main Networks for Vulnerabilities and Breakages
  - Hazardous Waste Sites and Need for Remediation of Contaminated Plumes Through Full or Partial Soil Removal

- Prioritize capital improvement projects to replace and/or renew deteriorating and inefficient pipelines and supply assets
- Use best management and practices and monitor land in wellhead protection areas for expenditure of contaminants
- Remove combustible material from sites during building processes and create “defensible spaces” around buildings
- Increase open, lit spaces to discourage tick community growth

Scale of Implementation

Site-Specific

Municipality

Co-Benefits

EDUCATIONAL

ECOLOGICAL

Examples of Ongoing Efforts

- NJDEP recently launched a Water Infrastructure Investment Plan (WIIP) to fund water-related capital improvement projects, including through NJ Water Bank-issued green bonds
- NJDEP’s Capacity Development (CapDev) program is specifically designed to identify and address water systems with technical, managerial, or financial deficits
- NJDEP Office of Environmental Justice’s Community Collaborative Initiative (CCI) works to remediate brownfield sites
- Hoboken Water Main Replacement Program
- Newark Lead service line replacement program
- Jersey City Lead Free JC Program
- Jersey City is undertaking a Climate Vulnerability Assessment for priority assets

POLICY AND GOVERNANCE

Action – Enforce Existing Regulations and Pursue Higher Standards

Tools

Ensure all municipalities and the state are aspiring to or in line with federal and international higher standards, including:

- 2021 federal U.S. Department of Labor Occupational Safety and Health Administration (OSHA) standards, including inspection guidance for heat-related hazards, in line with the National Emphasis Program (NEP) on heat inspections (effective April 2022)
- 2021 International Energy Conservation Code (IECC) on energy efficiency and performance as well as spot-ventilation, isolation, and insulation of electrical and mechanical heat systems
- Federal EPA air quality standards
- World Health Organization (WHO) Global Air Quality Guidelines
- 2018 International Residential and Plumbing Codes water conservation and efficiency standards
- 2018 International Green Construction Code water conservation and efficiency standards

Establish new regulations and ordinances

- Require new public or publicly-funded buildings and facilities (such as transportation terminals or bus stops) to include outdoor heat mitigation features such as canopy cover or photovoltaic (PV) shade canopies, water-based cooling stations, or cool pavements
- Implement load restrictions for older roads, bridges, and rail to reduce traffic on vulnerable transportation infrastructure which might experience material stress
- Conservation subdivision ordinances to ensure water-efficient landscaping, e.g., requiring retainment of wooded areas or requiring a certain percentage of low water-use plants be used in design
- Adopt statewide regulatory amendments needed to require American Water Works Association (AWWA) water loss audits and meet other benchmarks
- Streamline SOPs and processes to obtain a Water Allocation Permit for Reclaimed Water for Beneficial Reuse (RWBR)
- Mandate routine water supply asset condition assessments
- Expand Groundwater Quality Standards to include a broader list of contaminants
- Stricter zoning laws to create overlay zones that protect any water within the 1- 5- or 10- year time of travel zones
- Require tougher fireproofing and fire safety regulations on homes, and restrict development in fire-prone areas to decrease areas referred to as “Wildland Urban Interfaces”

Examples of Ongoing Efforts

- 2021 NJ Stormwater Rule that requires municipalities to update their Stormwater Control Ordinances (SCOs) to require green infrastructure be included with new development. Model ordinances are provided
- State Emission Statement rule that establishes regulations for the annual reporting of air contaminant emissions from stationary sources to help with the monitoring of the state’s progress toward the mandatory emissions reduction protocols
- NJ Air Quality State Implementation Plan (NJ) regulations
- New Jersey’s existing statewide water quality standards, assessments, monitoring, and watershed-based plans and programs to reduce total maximum daily loads
- Enforce landlord regulations for provision of window and door screen protections to tenants (mosquito protection)
- Regulations on design of water conveyance and holding structures to minimize potential for mosquito habitats

Scale of Implementation

Municipality

State

Co-Benefits

ECOLOGICAL

POLICY AND GOVERNANCE

Action – Enhance Regional Planning and Coordination

Tools

- Expand regional coordination to collaborate on:

Fire Protection in New Jersey and Fire-Prone Areas in Surrounding States

Programs Associated with Reclaimed Water for Beneficial Reuse (RWBR)

Development of a Regional Drought Early Warning System (DEWS) that Includes NJ

Updated Strategic Management Plan for Invasive Species Reflecting Best Available Data on Climate Change-Related Impacts

Create Integrated Mosquito Management (IMM) Plans Including Surveillance, Removal of Larvae and Pupae, and Monitoring Control Systems to Mitigate Risk of Outbreaks

Identify Key Stakeholders and Advance Ocean Acidification Initiatives

Regional Goals to Support Local Planning for Better, Accessible, Equitable Public and Multi-Modal Transportation Infrastructure.

- Create a contaminant source inventory that details depth and water-solubility
- Consider making New Jersey a reclamation state to allow state and regional coordination around federally-funded water supply management infrastructure projects

Examples of Ongoing Efforts

- 2017-2022 New Jersey Water Supply Plan
- 2015 New Jersey Energy Master Plan to improve resiliency of energy infrastructure

Scale of Implementation

Region

State

Co-Benefits

ECONOMIC

RECREATIONAL

SERVICE AND PROGRAM DEVELOPMENT

Action – Incentivize Private Actors to Implement Retrofits and Sustainable Practices

Tools

- Explore implementing incentives programs to:

Install Noncombustible Screens Over Vents and Safe Storage Propane Tanks in Homes. Remove Combustible Materials from Sites

Encourage Structural Water Conservation Retrofits, Water Audits, Low-Flow Plumbing Retrofits and Efficient Appliances, and Limited Irrigable Acreage

Encourage Widespread Property Retrofits, New Construction, and Landscaping Features with Heat Mitigating Strategies Such as the NYC Green Roof Tax Abatement

Reduce Private Car Owner Vehicular Emissions

Explore Public-Private Partnerships to start or Expand Bike Share Programs

Scale of Implementation

Region

State

- Incentivize hazardous site remediation efforts that include elimination of stagnant water sources and/or maintenance/drainage of surface water to prevent mosquito growth
- Explore cost-share programs and technical assistance programs to landowners to undertake forest and wildlife improvement practices

Co-Benefits

ECONOMIC

RECREATIONAL

Examples of Ongoing Efforts

- NJ Water Savers: drinking water conservation pilot program with residents and industries throughout New Jersey
- NJDEP's Residential Rainwater Harvesting: Provides tools to community members to harvest rainwater for use.
- Rutgers Water Resources Program: State-wide grant program tackling New Jersey's water conservation challenges

SERVICE AND PROGRAM DEVELOPMENT

Action – Undertake Robust Monitoring and Modeling Efforts Using Industry-Standard Technology

Tools

- Use community science tools to forecast and monitor risk and impacts at a localized scale, tied to community alert systems and other resources:
  - Extreme Heat and Urban Heat Island
  - Ground Oone/Aerosol Health Risks
  - Flooding
- Integrate best-available data on future climate, population, and land use trends into ongoing monitoring and modeling efforts using cutting-edge technology:
  - Air Quality Monitoring
  - Water Reservoir Modeling and Drought Monitoring
  - High Resolution Rapid Refresh to Forecast on Smaller Grid
- Conduct physical and financial audits to collect data on resource consumption:
  - Water Losses and Efficiency
- Conduct additional modeling to address critical data gaps:
  - Rising Groundwater Levels and Contaminant Source/Trajectory
  - Predict Changes in Ocean Carbon Cycles, Ocean Acidification Monitoring
  - Future Risk Projections and Modeling
  - Municipal-Level West Nile Virus Risk Modeling

Scale of Implementation

Municipality | Region | State

Co-Benefits

EDUCATIONAL

Examples of Ongoing Efforts

- NJDEP conducts surface water reservoir system modeling using RiverWare and similar software for the Hackensack/ Passaic River and Raritan River Basins
- NJDEP maintains extensive ambient and drought monitoring networks
- The Southward Environmental Alliance in Newark's Air Quality Monitoring Project identifies areas with high pollution levels to establish "Clean Air Zones"
- In 2021, Sustainable Jersey City mobilized 45 community members to collect temperature and air quality data points across Newark and Jersey City (and Elizabeth)

SERVICE AND PROGRAM DEVELOPMENT

Action – Prioritize Equitable Investments in Public Programs to Reach/Assist Under-Resourced Populations

Tools

- Initiate public programs to distribute critical risk-mitigating resources (alongside installation assistance), especially to environmental justice and other economically vulnerable communities:

Air Conditioners, Clean Energy Technologies and Transportation Subsidies

Soil Moisture/Rain Sensors and Smart Controllers for Irrigation Efficiency

Water Quality Test Kits, Emergency At-Home Water Filtration Systems

Sprays, Window and Door Screen Protections, Tickscape Resources

- Set up public health monitoring and screening programs that are accessible to everyone (including undocumented people) to help identify exposure to adverse health conditions in environmental justice communities:

Mobile Mammography and Other Cancer Screening with On-Site Medical Services, Assistance in Obtaining Subsidized Health Insurance

Localized Monitoring of Water Quality Conditions, Especially in High Hazardous Waste Proximity Sites

Examples of Ongoing Efforts

- NJ Department of Community Affairs help administer the Low-Income Home Energy Assistance Program (LIHEAP), a federally funded program to help low-income families and individuals meet home heating and cooling costs.

Scale of Implementation

Neighborhood

Municipality

State

Co-Benefits

ECONOMIC

EMERGENCY RESPONSE AND PREPAREDNESS

Action – Develop Hazard-Specific Emergency Response Plans Using National Best Practices

Tools

- Develop and/or update municipal-scale response and/or contingency plans with clear actions to address specific extreme events, including:
  - Heatwaves
  - Water Supply Emergencies and Severe Food Shortages
  - Aquifer Contamination and/or Hazardous Plumes
  - Severe Wildfire Smoke
  - West Nile Virus Seasonal Outbreaks
- Review existing plans and procedures to ensure they align with national best practices:
  - Streamline Existing Drought and Water Supply Emergency Management Procedures
  - Ensure Redundancy In Early Warning and Public Communication Systems
  - Incorporate Integrated Mosquito Management for Post-Flood Response

Examples of Ongoing Efforts

- New Jersey statewide regulations that require all water allocation permit holders to submit updated Water Conservation and Drought Management Plans (WCDMPs)
- NJDEP encourages all households to make an emergency plan in the event of any severe weather disaster and offers guidance to citizens to realize them
- NJDEP provides a worksheet and technical guidance for Wastewater Systems Emergency Response Plans

Scale of Implementation

Neighborhood | Municipality | State

Co-Benefits

ECONOMIC

EMERGENCY RESPONSE AND PREPAREDNESS

Action – Invest in Accessible Shelters, Cooling Stations, and Resilience Hubs

Tools

- Identify high-priority areas to expand the scope and concentration of universally accessible community centers for provision of relief and resources during extreme events:

Cooling, Electricity/Wi-Fi During "Brown-Outs," Potable Water Distribution

Well Air-Filtrated Spaces with Electricity and Wi-Fi for Poor Air Quality Days

Potable Water Distribution

Shelter, Potable Water and Food During Severe Weather

- Work with local civic groups and mutual aid networks to encourage and support establishment of multi-purpose “resilience hubs” that can serve as both shelters/cooling stations while also providing additional community resources, capacity building, and space for civic organizing and advocacy to advance action

Support Education and Organizing Around Health Risks and Actions/Policies to Mitigate

Preparedness Capacity Building, Trained Community Disaster Response Network

Support Education Around Increasing Risks, Organize Cleanups of Stagnant Water Sources

Scale of Implementation

Neighborhood

Municipality

Co-Benefits

ECONOMIC

Examples of Ongoing Efforts

- Most municipalities have started to implement cooling centers on extreme heat days in dense urban areas
- Newark submitted a BRIC application in 2021 to implement a resilience hub at Ann Street School in the Ironbound neighborhood