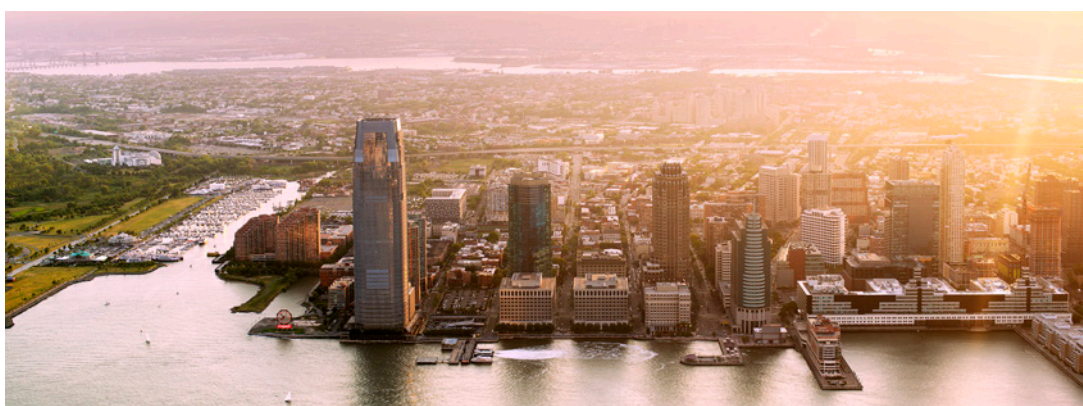




NEW JERSEY

# EXTREME HEAT RESILIENCE ACTION PLAN



2024



*This work was made possible with financial assistance from the Coastal Zone Management Act of 1972, as amended, administered by the Office for Coastal Management, National Oceanic and Atmospheric Administration (NOAA) through the New Jersey Department of Environmental Protection, Coastal Management Program.*

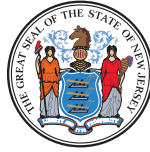
## ACKNOWLEDGEMENTS

**The New Jersey Extreme Heat Resilience Action Plan would not have been possible without the help of the following State departments, agencies, and organizations:**

**Interagency Council on Climate Resilience:**

- Department of Agriculture
- Department of Banking and Insurance
- Department of Community Affairs
- Department of Environmental Protection
- Department of Health
- Department of Human Services
- Department of Law and Public Safety
- Department of Military and Veterans Affairs
- Department of State
- Department of Transportation
- Department of Treasury
- Board of Public Utilities
- Housing and Mortgage Finance Agency
- Economic Development Authority
- New Jersey Infrastructure Bank
- New Jersey Transit
- New Jersey Turnpike Authority
- New Jersey Sports and Exposition Authority
- New Jersey Office of Emergency Management
- New Jersey Highlands Council
- Pinelands Commission
- Port Authority of New York and New Jersey

**Primary Authors: Nathaly Agosto Filión, Montana Knutsen, and Shamay Phillips.**



April 2024

Fellow New Jerseyans,

On behalf of the Interagency Council on Climate Resilience, I am proud to present New Jersey's Extreme Heat Resilience Action Plan.

Although not the most visible climate impact in New Jersey, extreme heat is unfortunately one of the most immediate and deadly climate-related dangers that we face. We are already seeing warmer year-round temperatures and more frequent heat waves, both of which contribute to increased daily morbidity and heat-related illnesses.

Certain populations are at greater risk of adverse health effects related to extreme heat, including—but not limited to—children, the elderly, outdoor workers, those with chronic health conditions, and those without reliable access to indoor cooling. Addressing the needs of these populations in our response to extreme heat has been, and will continue to be, a priority.

Building on the [2021 Statewide Climate Change Resilience Strategy](#), this Resilience Action Plan seeks to advance concrete actions that will address the challenges posed by extreme heat. The plan was developed by the Interagency Council on Climate Resilience, a body of twenty-two state executive branch agencies and departments who worked collaboratively over the last year and a half to identify over 130 meaningful actions that address the complex and multifaceted nature of extreme heat and its impact to New Jersey communities.

In addition to working with one another, the Interagency Council on Climate Resilience relied on the knowledge of national experts, targeted stakeholder groups, and constituents who provided invaluable insights and feedback that were incorporated into this plan. We thank every individual who shared their time, resources, and thoughts with us during the plan development process.

Although this is a state-level plan, we cannot overlook the importance of local and community-based action in addressing the climate challenge. Many actions in this plan seek to uplift, incentivize, and support heat resilience and response efforts at the local level, such as at county offices of emergency management, municipal planning departments, and even small businesses. This plan also seeks to empower everyday citizens with the knowledge they need to prepare themselves, their families, and their community for extreme heat events.

As we begin to implement the actions outlined in this plan, we will continue to build upon the foundation of interagency coordination that we established through the Interagency Council and strengthened through the development of this plan. Together, we can build a future for New Jersey that is safe, sustainable, and resilient for all.

A handwritten signature in blue ink, reading 'Nicholas Angarone'.

Nicholas J. Angarone, PP/AICP  
New Jersey Chief Resilience Officer



NEW JERSEY

# EXTREME HEAT RESILIENCE ACTION PLAN

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An aerial photograph of a dense urban area in Hoboken, New Jersey. The image shows a grid of streets with numerous multi-story buildings, many with flat roofs. Some roofs are covered in snow or light-colored debris. The streets are filled with cars and some larger vehicles. A teal-colored rectangular overlay is positioned in the center of the image, containing the word "INTRODUCTION" in large, white, sans-serif capital letters.

# INTRODUCTION

*Hoboken, NJ*

*Hoboken, NJ*



Climate change is humanity's single greatest long-term threat. In New Jersey, the effects are already visible. Based on the research summarized in the 2020 New Jersey Scientific Report on Climate Change, New Jersey is one of the fastest warming states in the country, sea-levels are increasing at a greater rate than other parts of the world, and significant increases in precipitation events and flooding are projected. With a dense population and significant coastline on which a large portion of the economy depends, the state is at increased risk from the impacts of a changing climate. While the state remains committed to reducing emissions, New Jersey is past the point of avoiding all climate change impacts and needs to enact measures to adapt.

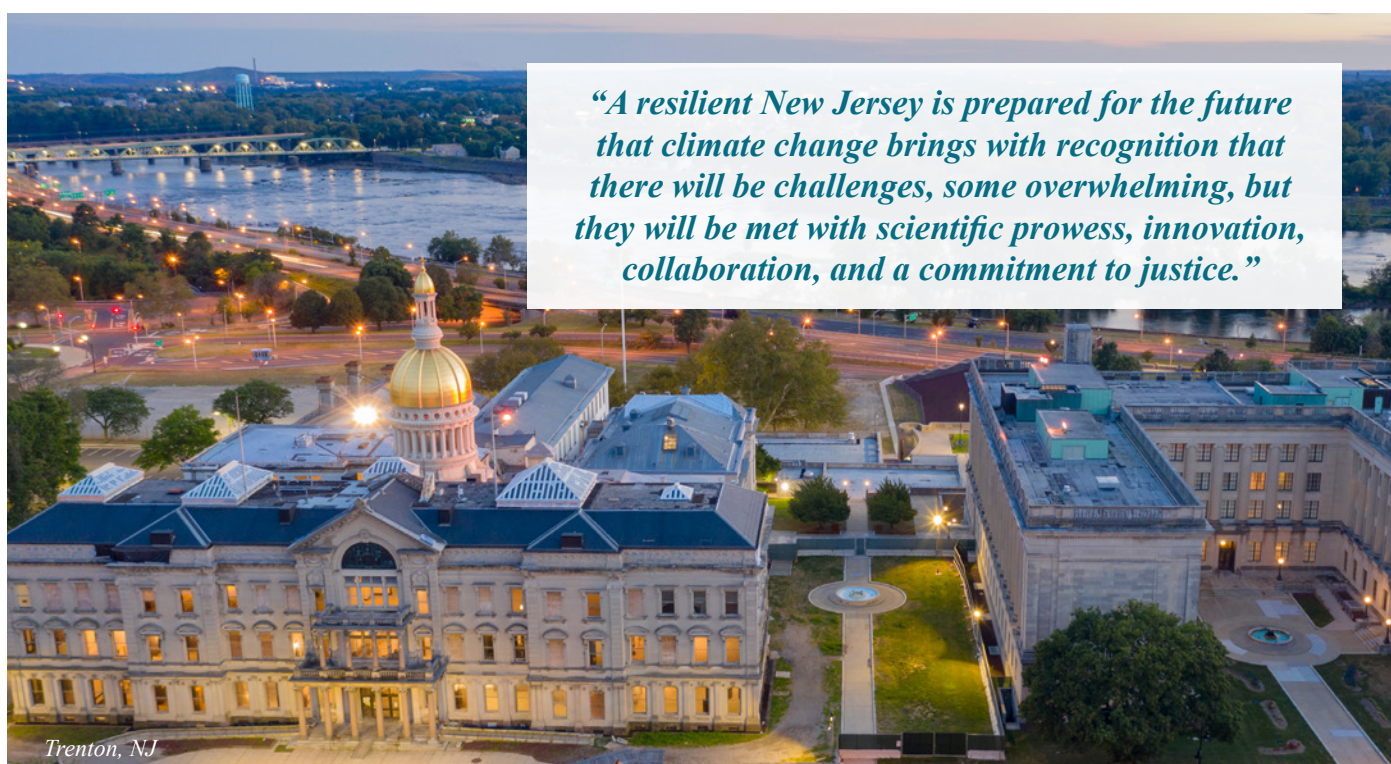
Our environment, economy, communities, and infrastructure are all at risk. New Jersey has taken many steps to improve decision-making to reduce risk, including the establishment of the Interagency Council on Climate Resilience (Interagency Council or IAC), the release of New Jersey's first Scientific Report on Climate Change (Scientific Report), and the Statewide Climate Change Resilience Strategy (Resilience Strategy or CCRS). The Scientific Report and Resilience Strategy serve as the foundation guiding New Jersey state agency actions to advance climate resilience.

The Interagency Council is committed to working together to develop plans and documents that outline how state agencies will incorporate climate resilience into their policies, programs, and regulations. State agencies have a duty to protect state residents, as well as the resources and communities which they serve, to the best of their ability. Developing climate resilience plans is a significant step and this Extreme Heat Resilience Action Plan is one such example of this effort.

## Background

### Purpose and Authority

In 2019, Governor Murphy signed Executive Order No. 89 (EO 89), which ordered New Jersey to take proactive and coordinated efforts towards climate resilience. EO 89 also called for the development of a Scientific Report on Climate Change utilizing the best available science and data specific to New Jersey and considering a wide range of climate change related hazards (released June 2020). The executive order additionally established the Interagency Council on Climate Resilience to enhance coordination on the state's resilience efforts. EO 89 directed the Commissioner of the Department of Environmental Protection (DEP) to appoint a Chief Resilience Officer of the State of New Jersey to lead development and implementation of the Statewide Climate Change Resilience Strategy.





*“The science finds that New Jersey has already warmed more rapidly than the rest of the Northeastern U.S., a trend that is expected to continue.”*



Wildwood, NJ

### The Scientific Report on Climate Change

In 2020, the Department of Environmental Protection (DEP) released the [New Jersey Scientific Report on Climate Change](#) (Scientific Report), the first State-led assessment summarizing current and projected climate conditions. The impacts identified are wide-ranging and have both direct and indirect implications.

Climate change is driven by increases in atmospheric levels of greenhouse gas concentrations, absorbing increased levels of heat in the Earth’s atmosphere – a process accentuated greatly by emissions released from human activities. Climate impacts identified and studied include extreme heat, increased precipitation both in intensity and frequency, ocean acidification, sea-level rise, increased air pollution, threats to water supply and quality, changes in crop and livestock productivity, lengthened wildfire seasons, increase in invasive pests and plants, loss of wetlands and forested habitats, changes in habitat suitability, increased prevalence of infectious diseases, and unique mental health challenges.

These climate hazards pose threats to our ecosystems and natural resources, infrastructure, physical and mental health, industries, and economies – in fact, our entire way of life. Climate change is affecting all areas of the state, in different ways, and action needs to be taken so that agencies may prepare for and react appropriately to the impacts of a changing climate.

Since this initial document, New Jersey has released additional scientific publications. As of November 2021,

New Jersey now has state-specific studies confirming rainfall has, and will continue to, intensify as a result of climate change.<sup>1</sup> Additionally, the [Human Health & Communities addendum](#) to the Scientific Report was released September 2022 providing additional documentation about how human health, both physical and mental, will be impacted by climate change.

### New Jersey Interagency Council on Climate Resilience

The Interagency Council, now encompassing 22 state departments and agencies and the Governor’s Office, is charged with coordinating the efforts of Executive Branch departments and agencies to develop and implement the Statewide Climate Change Resilience Strategy. They are tasked with developing consistent statewide policies and actions, and establishing both short- and long-term action plans by which Executive Branch departments and agencies will work both individually and collectively to accomplish the goals of EO 89. This Resilience Action Plan (RAP) is intended to serve as such an update to the Resilience Strategy.

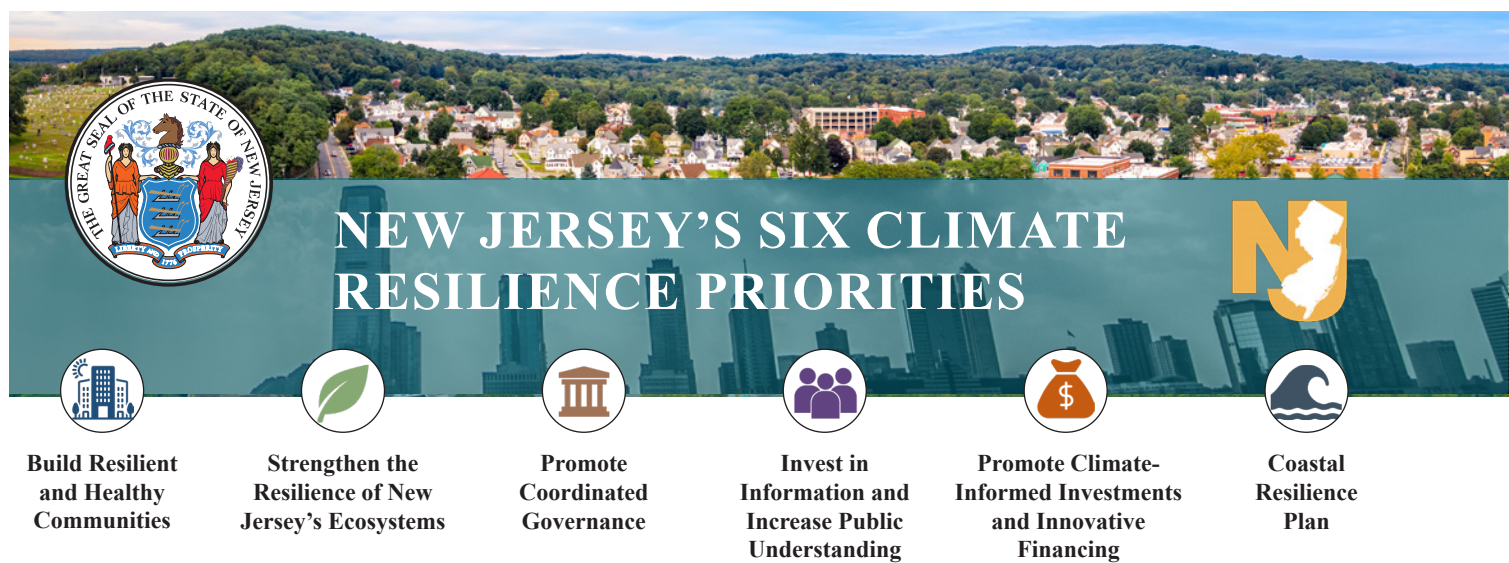
### The Statewide Climate Change Resilience Strategy

The inaugural Statewide Climate Change Resilience Strategy was released in October 2021, describing six priority topic areas and a total of 127 actions that provide a policy framework to guide state agency actions to address climate resilience. The priority areas, listed below, organized as foundational guidance, establish resilience goals for the State and its agencies:

- Priority 1: Build Resilient and Healthy Communities
- Priority 2: Strengthen the Resilience of New Jersey’s Ecosystems
- Priority 3: Promote Coordinated Governance
- Priority 4: Invest in Information and Increase Public Understanding
- Priority 5: Promote Climate-Informed Investment and Innovative Financing
- Priority 6: Coastal Resilience Plan

Both the Scientific Report and Resilience Strategy recognize that the impacts of climate hazards are not evenly distributed. Socially vulnerable populations and overburdened communities will bear a larger burden and must therefore be more heavily considered for resources and policies. Environmental justice is a priority of New Jersey’s resilience efforts and is to be incorporated throughout agency actions and decision-making.





### A Vision for Climate Resilience

New Jersey defines “climate resilience” as the ability of social and ecological systems to absorb and adapt to shocks and stresses resulting from a changing climate, while becoming better positioned to respond in the future. Resilience is not an end-state, but a dynamic state of being that will grow more difficult to attain as the climate continues to change. Resilience is perseverance with grace, strength in the face of adversity and hardship, resourcefulness to leverage what is available, and faith in the road that lies ahead. A resilient New Jersey is prepared for the future that climate change brings with recognition that there will be challenges, some overwhelming, but they will be met with scientific prowess, innovation, collaboration, and a commitment to justice. Furthermore, resilience efforts should support, and not undermine, the effort to slow climate change as described in the [New Jersey Global Warming Response Act 80x50 Report \(2020\)](#). These principles of building climate resilience thread through the actions in this Resilience Strategy and underscore the Interagency Council’s commitment to building a stronger and fairer New Jersey while proactively confronting climate change.

### Resilience Action Plans

The purpose of a RAP is to emphasize the importance of climate resilience in all aspects of state agencies’ programs and lay out state agency plans to address climate impacts. Any RAPs that the Council produces in the future will describe the climate hazard, the threat it poses, and why it is an important consideration. RAPs will identify actions specific to individual agencies and actions to be implemented across numerous agencies, all put forth to support implementation of the Resilience Strategy. Actions may include changes to and/or new policy, procedures, programs, authorities, legislation, permitting requirements, funding criteria, capital programs and projects, data and research initiatives, and regulation. Actions are not meant to be site-specific or overly detailed; for example, agencies are not expected to identify projects or actions to protect specific facilities from climate impacts but could identify an action such as assessing or addressing vulnerabilities to State-owned facilities.

Resilience Action Plans lay out ongoing, achievable, and aspirational actions that lend to the resilience of the state as a whole. Because each agency is different, the actions vary greatly. That said, all agencies have been tasked with considering the climate threats, and how they impact their decision-making with the same end goal of increased resilience. This process is meant to establish these plans as living documents, allowing for transparency and progress tracking. RAPs are developed through a collaborative effort across all the agencies of the Interagency Council with guidance and feedback from Advisory Groups and stakeholders.



## Summary of Extreme Heat Resilience

### Action Plan Commitments

This plan is made up of 135 actions, organized thematically into twenty focus areas and further organized to align with the priorities outlined in the foundational policy framework of New Jersey's Climate Change Resilience Strategy. Action commitments address the activities completed, ongoing, or recommended in individual agencies, as well as efforts that cut across several or all state agencies who make up the Interagency Council on Climate Resilience (Figure 1). Actions included in this plan are designed to address community health, equity and justice, research needs, coordination of government, and funding, financing, and investment needed to implement the action, in accordance with the Resilience Strategy.

State agency efforts most directly related to matters of health and community-level resilience action can be found under *Priority 1: Build Resilient and Healthy Communities*, which includes twelve focus areas laid out in Figure 2. *Priority 2: Strengthen the Resilience of New Jersey's Ecosystems* includes actions related to Agriculture, Ecosystems and Habitat, and Harmful Algal Blooms. *Priority 3: Promote Coordinated Governance* includes commitments related to actions related to Legal and Regulatory Affairs, Legislation and Advocacy. The fourth chapter of this plan includes actions that

help New Jersey to *Invest in Information and Increase Public Understanding* and includes actions related to Advancing Scientific Understanding of Extreme Heat as well as Communications and Outreach. The fifth and final chapter *Promote Climate-Informed Investments and Innovative Financing* describes state agency actions related to Funding Programs Revision and Financing. While New Jersey's Coastal Resilience Plan comprises Priority 6 of the Resilience Strategy, there is not a direct, matching chapter in the Extreme Heat Resilience Action Plan as state agency commitments detailed in this plan on extreme heat would apply statewide (and are not limited to, or exclude, New Jersey's coastal zone).

Each of the twenty focus areas opens with a brief explanation of the relevance of that topic with the context of building New Jersey's resilience to extreme heat and an accompanying inset box listing the titles, lead agency, and implementation status of each of the state agency actions related to that section of the plan.

State agency activities are explained in additional detail in the accompanying appendix, which includes a brief narrative explaining why the action is important and/or a priority for the agency, as well as the anticipated

Figure 1. Extreme Heat Resilience Action Plan Elements and Guide

#### Plan Elements

5

Resilience  
Strategy Priorities

20

Focus Areas

135

Actions

#### Plan Guide

Resilience Strategy  
Priority

Focus Area

Action Number

Action Name

Action Status



Recommended



Ongoing/Underway



Completed

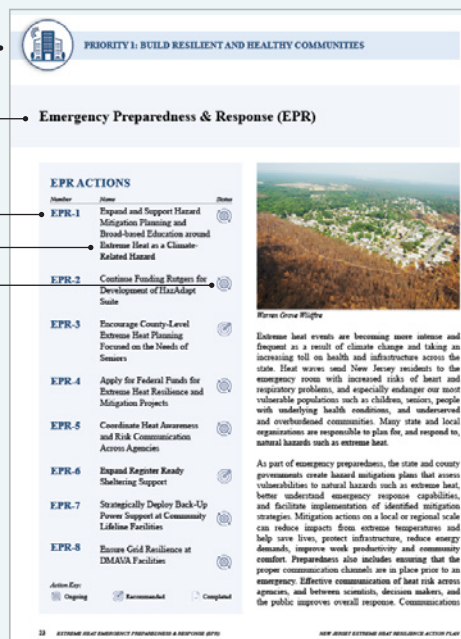




Figure 2. Priority 1 Focus Areas

### Priority 1: Build Resilient and Healthy Communities

- Emergency Preparedness & Response
- Cooling Centers
- Housing & Residential Cooling Support
- Worker Safety & Workplace Heat Illness Prevention
- Public Health
- Energy Infrastructure
- Drinking Water & Water Supply
- Transportation
- Municipal Capacity Building & Technical Assistance
- Regional Planning
- Urban Heat Islands
- Urban Tree Canopy & Community Forestry
- Recreation

challenges, co-benefits, and next steps for implementation. Items identified in the matrices included in the appendix to this plan are consistent across agencies, allowing for transparent updates to stakeholders and a more effective method of communicating progress and status of activities across state agencies.

### Identified Gaps in Agency Actions

Throughout the development of this plan, the Interagency Council recognized a number of gaps in potential actions for combating the impacts of extreme heat which have not been included in this plan. These include efforts to build extreme heat resilience for specific populations and sectors for which member agencies of the Interagency Council on Climate Resilience do not have the authority or jurisdiction to intervene. Gaps include efforts to advance extreme heat resilience in schools and daycares, correctional facilities, as well as targeted activities to reach vulnerable populations such as unhoused individuals, residents of mobile homes, undocumented people, and pregnant people.

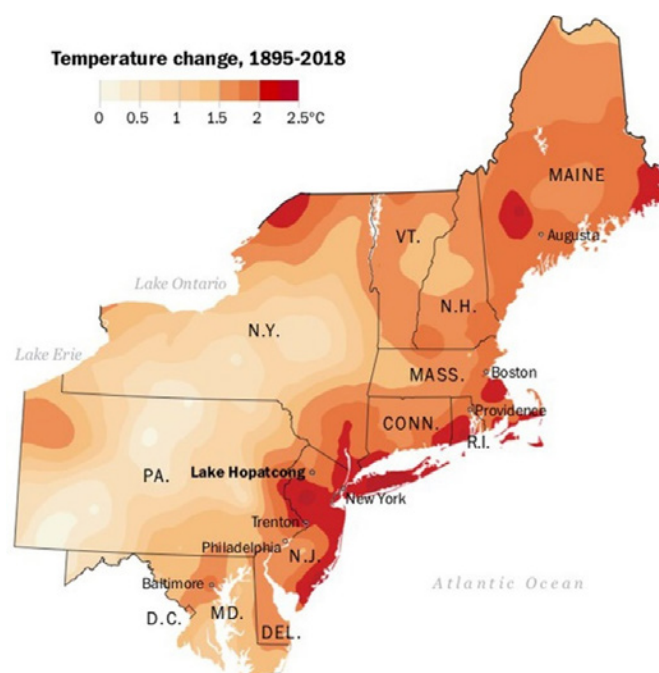
Each of the actions included herein represents an existing or recommended activity proposed and vetted by member agencies of the Interagency Council. As such, efforts by state agencies and departments outside of the Interagency Council are not included herein.

## Why Heat? Why Now?

### Observed and Projected Warming Trends in New Jersey

Climate change is significantly increasing the number of people exposed to extreme heat, particularly in New Jersey. The science finds that New Jersey has already warmed more rapidly than the rest of the Northeastern U.S., a trend that is expected to continue (see Figure 3).

Figure 3. Temperature Change in the Northeast between 1895-2018. Source: The Washington Post



Among its top findings, the 2020 New Jersey Scientific Report on Climate Change found that New Jersey is warming faster than the rest of the Northeast region and the global average. Whereas *global* temperatures have increased by 1.5-2°F in the last 125 years, temperatures in NJ have increased by 3.5°F over the same period.

It is critical that New Jersey executive branch agency leaders and decision-makers consider the nuanced and localized impacts of extreme heat in our statewide resilience planning efforts, prepare for more heat events, and implement efforts to protect New Jersey residents, infrastructure, and the environment from heat-related impacts in the future.

New Jersey temperature records have been collected since 1895, providing researchers with nearly 130 years of data from which to draw conclusions. The clear trend towards warming has increased noticeably in recent decades.



Professor Ed Hawkins of the University of Reading developed a series of “warming stripes” graphics (see Figure 4 and 5)<sup>2</sup>, in an effort to simplify the complexity of climate change data in a compelling and clear way.

We can clearly see a pattern of significantly warmer annual average temperatures as we move into the 21st century. For example, 15 of New Jersey’s 20 warmest years on record occurred after 2000 and our 10 coldest years on record occurred before 1941.<sup>3,4</sup>

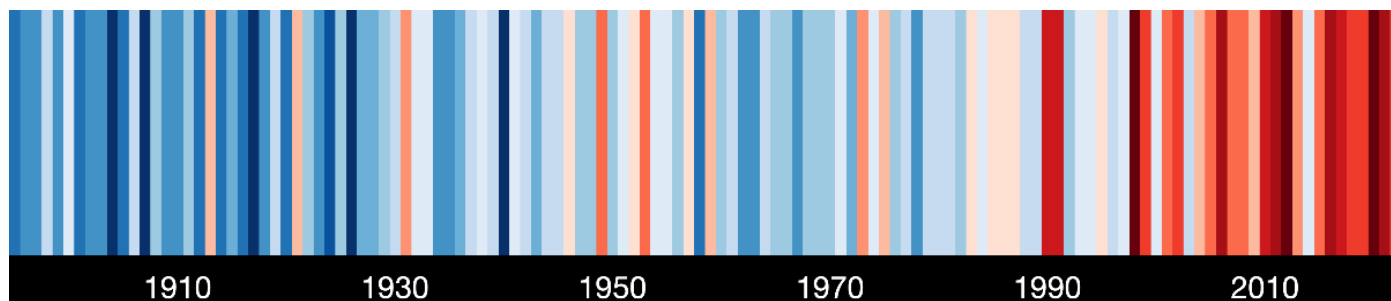
## Warming Winters

Temperature increases vary geographically and throughout the four seasons. According to the [Climate Change in New Jersey: Impacts & Effects](#) web resource,

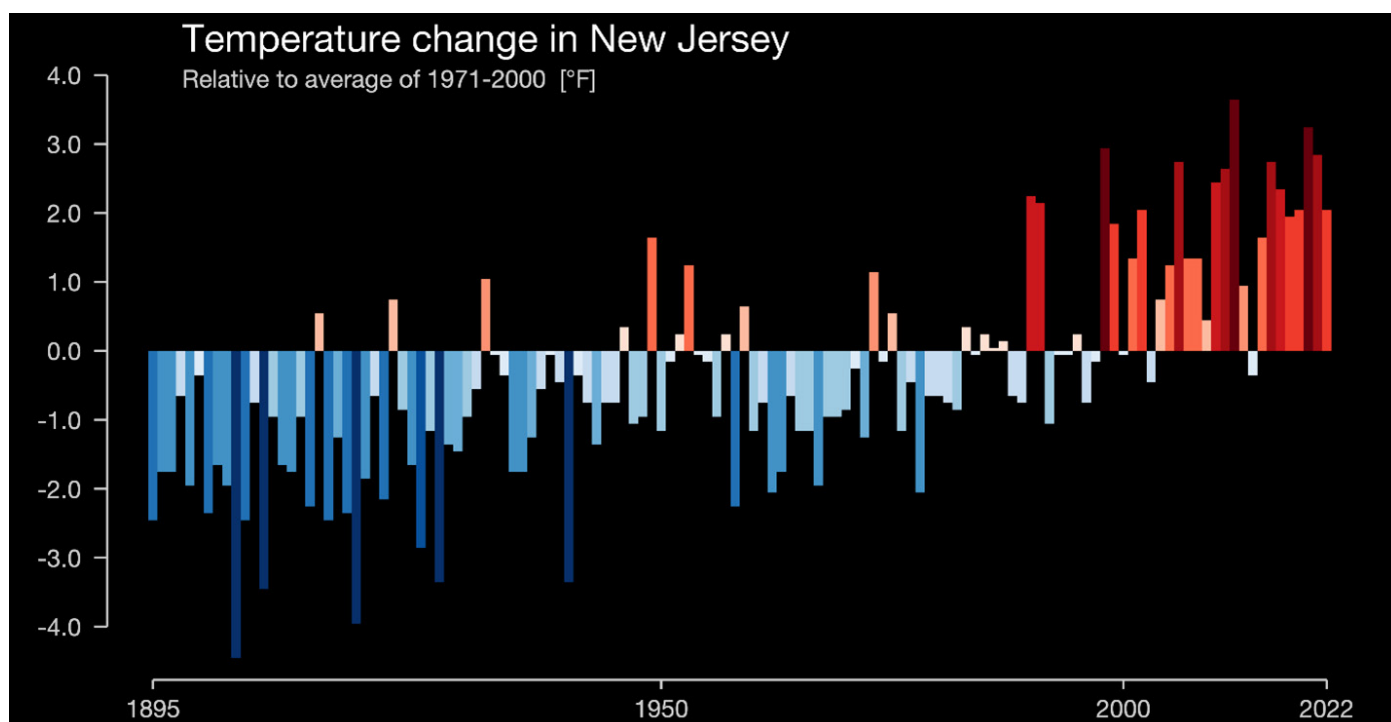
an increase in temperatures during winter (December, January, and February) results in less intense cold waves, fewer sub-freezing days, and less snow accumulation. From 1896 to 2021, the statewide average temperature for the spring and fall has increased by 3.2°F, while the summer increase has been slightly higher at 3.4°F (See Table 1) . The average winter temperature, meanwhile, has increased by 5.1°F.<sup>5</sup>

Our warming winters appear to be the strongest driver of the shift in our average annual temperatures, not only in New Jersey but across the United States. According to the Office of the State Climatologist, January 2023 tied 1932 for warmest January since 1895 (when records began). New Jerseyans are consistently experiencing more mild

**Figure 4. Temperature Change in New Jersey since 1895**



**Figure 5. Temperature Change in New Jersey Relative to Average of 1971-200 [°F]**



Each vertical bar represents the average temperature during a given year: blue toned bars indicate a cooler than average year and red-toned bars indicate a warmer than average year (years representing the average temperature over the 125-year temperature record are shown in white).



winter weather days than cold ones. It is important to note here that weather and climate are inherently different, with the day-to-day variability (weather) often masking the bigger decadal trends (climate). Hence the need to take a step back and consider the bigger picture.

In the nation's Fourth National Climate Assessment (released in 2018), the National Oceanic and Atmospheric Administration noted that winters in the Northeast have been warming three times faster than summers.<sup>6</sup> The recently released Fifth National Climate Assessment (NCA5, released Fall 2023) affirms this and further describes negative impacts to winter tourism and cold-weather sports, invasive species migration and pest proliferation due to overwinter survival rates of certain species during the warmer winter nights. The NCA5 also recognizes certain benefits of warming winters, such as a newly abundant supply of white shrimp and blue crabs, for example, leading to their increased productivity due to favorable (warmer) conditions. However, this is married with simultaneous shifts in ocean acidification rates that exert stress on other important fisheries resources, such as oysters, clams and mussels.<sup>7</sup>

### Confluence of Extreme Heat and Other Climate-Related Threats

Shifts in the historical temperature norms cannot be seen in isolation. One important example of the confluence of heat and other climatic shocks and stressors is the fact that warmer days often result in heavier, more intense storm events because warmer air can hold more moisture. As air warms, there is an increase in the concentration of water vapor. The 2020 New Jersey Scientific Report on Climate Change indicates that from 2010-2020, average annual precipitation has increased by 7.9% as compared to historical averages. Additionally, storm events producing extreme precipitation have increased by 71% over the last 50 years. These heavy, intense storm events result in greater, more damaging risks from flooding.

Drought is another climate hazard impacted by warming weather trends. In addition to shifting precipitation types (e.g., snowfall to rainfall) and intensities (e.g., light rain to storms with heavy rainfall), increasing temperatures can increase evapotranspiration rates and result in increasing soil moisture deficits.<sup>8</sup> Hot and dry conditions during the summer months are particularly concerning to New Jersey's water supply managers, agriculturalists, and natural resource managers, among others.



	°C	°F				
	Annual	Annual	Winter	Spring	Summer	Fall
Statewide	2.1	3.8	5.2	3.3	3.5	3.3
North	2.2	4.0	5.5	3.4	3.4	3.4
South	2.1	3.8	5.0	3.2	3.5	3.1
Coast	2.4	4.3	5.4	3.8	4.1	3.8

Table 1. Annual and Seasonal Increases in Air Temperatures Over the Period 1895 to 2022<sup>10</sup>. The increase in average temperature in each cell of the table was determined from the linear slope of the entire data set from 1895 to 2022. In this case, the linear slope tells us the average rate of change over the period of record. From that rate we can determine how the temperature has changed over time.

These are not the only examples of overlapping stressors causing interrelated, and often cascading, impacts to New Jersey's communities, infrastructure, economy, and natural resources. Rather, this summary of co-existing climate threats is meant to call attention to the various hazard risks New Jersey state agency leaders and decision makers need to consider in developing interventions to the challenges of extreme heat.

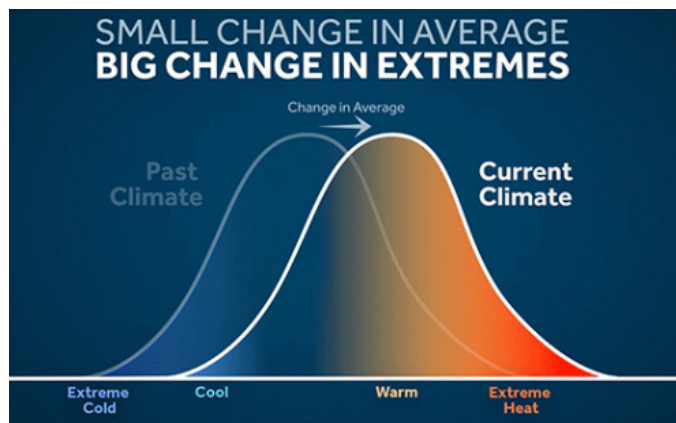
### Extreme Heat Events

Across the United States, the average number of heat waves per year in metropolitan areas has increased from two days per year to six, according to data from the EPA.<sup>9</sup> In New Jersey, the total number of days over 90°F has increased by roughly 36% since 1949, and extreme heat events are predicted to increase in both intensity and duration in future years.

While there are temperature differences between north and south, coastal and inland, and urban and rural sections of New Jersey, on average local weather station observations from throughout the state indicate that the number of days over 90°F have increased from an average of 14 days per year (in 2000) to an estimated 23-29 days in the decade of the 2020s.<sup>10</sup>



Figure 6. Change in Extremes ([Climate Central](#))



Climate Central, a Princeton-based nonprofit, provides a simplified visualization which demonstrates how our shift towards a warmer climate increases the likelihood of dangerously warm temperatures (Figure 6).

### Pronounced Heat Risks in Urban Areas

Based on the research collected for the Scientific Report on Climate Change, we know that heat waves will occur more frequently, and for longer periods of time, but also that they will impact larger areas<sup>11</sup> of New Jersey in part because of the high number of urban areas in the state. Urban and suburban infrastructure, such as buildings, roads, and other infrastructure, absorb and re-emit the sun's heat, resulting in "islands" of higher temperatures relative to outlying areas.<sup>12</sup>

In a densely populated state like New Jersey with large expanses of asphalt and concrete that have replaced forests, fields, and other open spaces, residents in cities and even some suburban areas are among those most at risk of extreme heat due to the ways in which the heat island effect significantly raise the "real feel" temperature on very hot days (see Figure 7).<sup>13</sup> Accordingly, individuals living in more densely populated areas with less tree cover are considered especially vulnerable, and considerably more likely to experience the worst, and long-lasting impacts of a heat wave.

Mapping land surface temperature (LST) provides a simple and accessible tool for getting a preliminary understanding of how extreme heat impacts vary across New Jersey's diverse landscape. While imperfect, this map-based analysis helps to provide decision-makers with a rudimentary sense for which cities and towns are more likely than others to suffer from excessive heat levels as compared to other areas of the state (see Figure 8). To

produce this map, the DEP leveraged Landsat satellite data provided by the United States Geological Survey (USGS) to show LST for New Jersey.<sup>14</sup> As evidenced in the graphic, the areas of New Jersey which stand out as warmer coincide with the more urbanized regions of the Garden State. Conversely, the largely forested and rural areas of New Jersey have comparatively cooler LST. An area of the state labelled with 100+ degrees LST can

Figure 7. Heat Island Effect Diagram ([EPA](#))

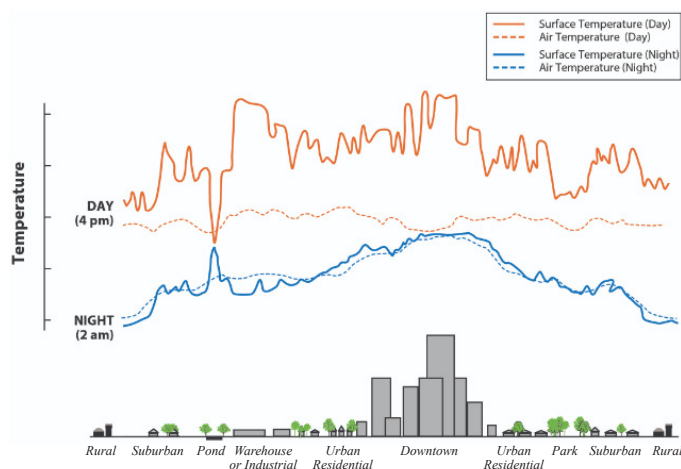
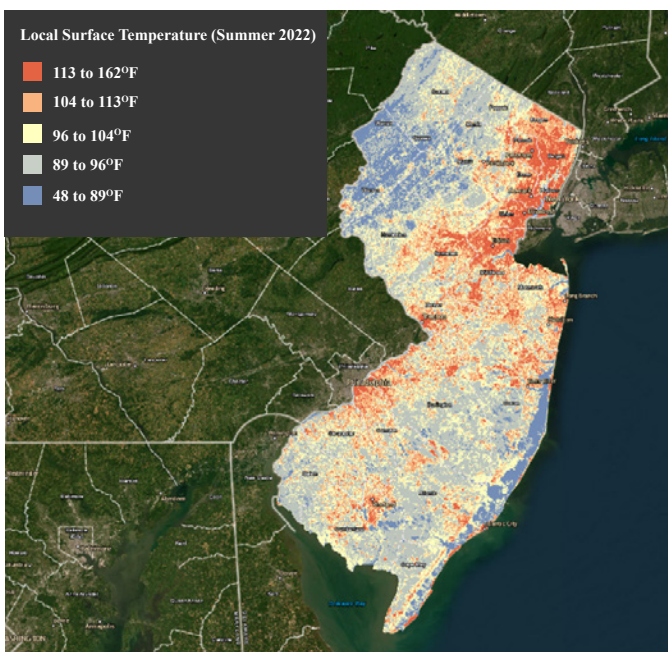


Figure 8. The Urban Heat Island Effect and Land Surface Temperature in New Jersey ([DEP Heat Hub NJ](#))





be challenging to interpret to the public as these satellite-based data observations are not designed to convey the actual temperatures experienced by the human body in these redder areas of the map. Rather, an LST reading from a hot summer's day provides an indication of the temperature reading of inanimate surface materials, such as dark-colored roofs or asphalt roadways.

### Heat Stresses on Infrastructure

A range of temperatures based on historic records is used when designing and engineering the roads, bridges, the power grid, and even buildings in New Jersey. This allowed our infrastructure to perform in the winters and summers, and all the temperatures in between. As the state faces higher temperatures and more frequent heat events outside of these historic norms, the potential for infrastructure failure increases. This is due to both the materials and design of the infrastructure, as well as increased stress from the demand the systems face. Roads may buckle, railways may twist, and power outages may increase. There is a greater risk of structural damage to bridge joints and pavement, e.g., buckling or rutting. Additionally, higher temperatures may inhibit construction activities during certain months or times of day.

For energy systems, increases in extreme high temperature events and heat waves will increase energy demand, decrease the efficiency of power plants, may cause failure in transformers, and may overheat the power lines, causing local power outages. In addition to the cost of damage to the infrastructure, the risks of a vulnerable power grid threaten human health and well-being of residents and visitors. When Hurricane Ida knocked out power in Louisiana in 2021, more people died from the heat than had died in the storm. Having a resilient power grid, back-up power supply, and places with back-up power available as cooling options during a heat event are critical strategies for the state to address the impacts of heat waves on energy infrastructure.

In transportation systems, higher temperatures compromise asphalt, concrete, and steel, as well as change demand for public transportation. Concrete degradation from direct sunlight and heat can cause cracks, dimpling of the material, and expansion within the structure which allows moisture to infiltrate and break down the stability of the foundation/support. Asphalt can melt when temperatures rise beyond their designed range.

## Heat Islands & Equity



[An EPA review of several studies](#) found that some communities in the United States, particularly those that are low-income and with higher populations of people of color, have neighborhoods with higher temperatures relative to adjacent neighborhoods in the same city. The studies identify historic redlining as a contributing factor. Specifically, people of color and community members with low incomes are more likely than other groups to live in historically redlined neighborhoods that are present-day intra-urban heat islands.

“Redlining” refers to a now-illegal practice from the 1930s when the federal government labeled non-White neighborhoods as undesirable for real estate investment. Public and private lenders often withheld loans and other services from people in those areas, depriving residents of opportunities to grow their wealth.

The current body of scientific evidence shows that community members with low incomes and communities of color are disproportionately exposed to heat islands. For example, one study analyzed almost 500 U.S. urban areas using 2017 data. This study found that heat island effects were typically less severe in census tracts with higher median incomes and a higher proportions of White people. Neighborhoods with higher numbers of Black residents tended to have more intense heat island effects than other areas.



## Cost of Extreme Heat

Whether physical or mental, extreme heat illness is not only deadly, but also costly. Extreme heat lowers the productivity of workers and leads to a higher risk of heat-related injury or illness, both of which cost businesses millions each year. Heat-induced lost labor productivity already costs the U.S. an average of roughly \$100 billion each year.

According to a peer-reviewed Union of Concerned Scientists analysis and accompanying “Too Hot to Work” report and story map, under a mid-century “no action” climate policy scenario, approximately 18.4 million outdoor workers across the United States risk losing an average of seven or more workdays. Outdoor workers make up approximately 20% of New Jersey’s workforce; as such, the impact to New Jersey’s economy from this projected loss in earnings power is expected to reach approximately \$900 million for New Jersey alone.



Agriculture in New Jersey is an important contributor to the Garden State’s economy. However, there is reason to be concerned about the sector’s vulnerability to extreme heat. In addition to reduced worker productivity, heat can lead to reduced crop yields. Nationally, this can already be seen with \$720 million in lost revenue annually due to heat’s effect on corn yields. In New Jersey, temperature increases threaten many economically important crops, including blueberry, cranberry, squash, sweet corn, and tomatoes.

Likewise, as our nation’s infrastructure systems experience more frequent stress, damage, or disruption due to extreme heat, the costs of maintaining and repairing these systems will become more burdensome. According to the U.S. Cybersecurity & Infrastructure Security Agency, the cost of U.S. road maintenance and repairs due to rising temperatures could reach \$19 billion by 2040.

The impact extends beyond the materials themselves and also affects the conditions of the soils that support infrastructure that were considered when building critical systems. As temperatures increase, soils dry out from an accompanying drought or overuse of water, surface infrastructure such as roads and sidewalks may crack; subsurface infrastructure such as pipes may also crack under the rigidity of the surrounding soil.

These are just a few of the specific examples; scientists and infrastructure managers continue to research and study the impact of climate change on the built environment to develop resilience strategies to mitigate potential losses in efficiency or failure.

### Human Health

Extreme heat can be dangerous to health – even fatal. Climate models predict an increase in the number of days per year where temperatures will be in the range to negatively affect human health due to heat stress. But other key concerns from gradual warming trends also impact our air, water, habitats and wildlife which can result in increased exposures to pest- and water-borne pathogens, pollutants, and can worsen pre-existing health conditions.

Extreme heat, such as that experienced during heat waves, is dangerous to human health as the body’s systems for controlling body temperature can become ineffective by prolonged exposure to excessive heat. High temperatures can cause excessive sweating, leading to dehydration if an individual does not drink enough water to replenish the lost fluids. Dehydration can result in dizziness, weakness, confusion, heat exhaustion, and even heat stroke. Children and the elderly are especially vulnerable to dehydration; so too are outdoor workers who will spend extensive time in the extreme heat.

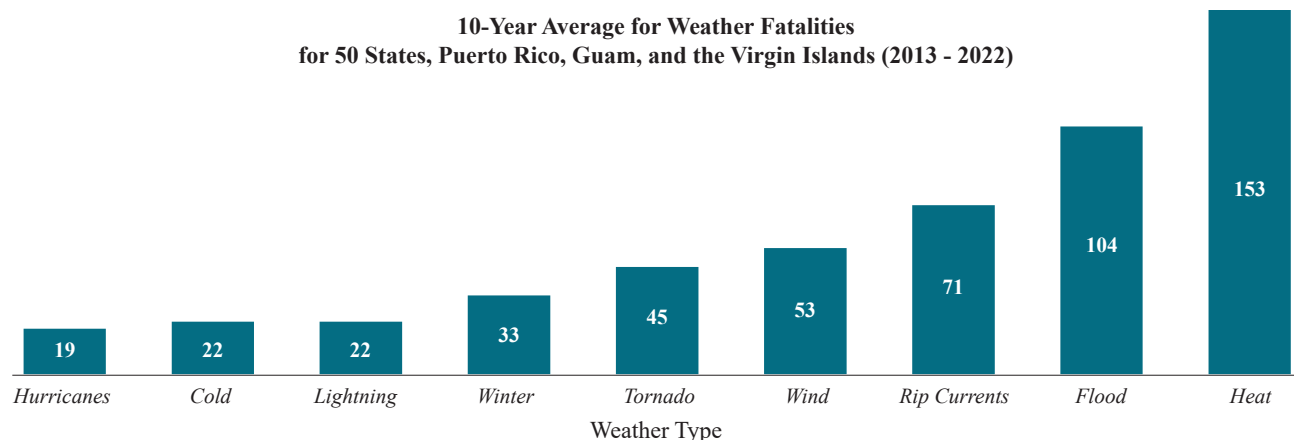
### Heat-related Mortality

Despite not being as visibly dramatic as other natural disasters like hurricanes, tornados, or floods, extreme heat events are far deadlier. In 2022 alone, an average of 700 deaths and more than 67,000 emergency department visits in the United States were attributed to extreme heat events such as heatwaves.<sup>15</sup> Using data originally published by the National Weather Service, the chart below (Figure 9) displays the average number of weather-related fatalities for 50 states, Puerto Rico, Guam and the U.S. Virgin Islands over the ten-year period spanning from 2013-2022.<sup>16</sup>



**Figure 9. 10-Year Average for Weather Fatalities (2013-2022).** Source: [National Weather Service](#)

Note: Fatalities found under “Hurricane” events are only attributed to the wind. Other fatalities associated with hurricanes (i.e. fatalities from flooding and tornados during hurricane events) are attributed here within their respective weather category (i.e. Tornado, Flooding).



Models from the early 2000s projected that under a high emissions scenario, climate change could result in as much as a 55% increase in summer heat-related mortality for the region in the current decade (2020s) as compared to the 1990s.<sup>17</sup> A more recent study on summer heat-related excess mortality found a general increase of 5,870 to 11,562 annual excess deaths in the eastern US by mid-century from a baseline in the mid-2000s, with the higher-end figure experienced by the population aged 65 and older. The change in mortality rate is an order of magnitude higher for the elderly population compared to the population at large. The study also found that urbanized counties are expected to experience the greatest health-related impacts. Without intentional, coordinated and strategic action to address these modelled projections, New Jersey could experience more significant heat related mortality by mid-century.

Heatwaves act as a threat multiplier. High temperatures put stress on the cardiovascular system, as the body works harder to cool itself down. This can strain the heart and increase the risk of heart attacks, particularly in individuals with pre-existing heart conditions. For example, dehydration – as is prone to happen during a heat wave – can lead to decreased blood volume, which increases heart rate and blood pressure, further straining an already vulnerable system.

Furthermore, extreme heat can worsen respiratory conditions such as asthma, as heat combined with humidity, which are both predicted to increase in New Jersey, can make it more difficult to breathe. Additionally, air pollutants, particularly ground level ozone which

## Heat & Air Quality

New Jersey’s air quality will be impacted by climate change, leading to increased human exposure to pollutants (e.g., ground level ozone and particulate matter), particularly in densely populated urban areas. Exposure to such air pollutants has been associated with symptoms ranging from eye irritation to severe respiratory distress, reduced lung function, chronic obstructive pulmonary disease (COPD), and increased mortality from lung cancer and heart disease.



Increased aeroallergens, such as pollen and molds, are another consequence of the altered atmospheric conditions driven by climate change (e.g., longer frost-free periods). This may result in a greater incidence of respiratory syndromes such as asthma.

The hotter conditions of heat islands and demographic inequities intersect with other risk factors. In particular, air quality worsens on hot, sunny days. A reaction between sunlight and air pollutants forms more [ground-level ozone](#), or smog. [Asthma is more common among some communities of color and low-income households than the general population](#), putting these populations at greater risk from hotter temperatures, air pollution, and the smog formed under these conditions.



forms in the presence of direct sunlight and heat, tend to be more concentrated during heat waves, exacerbating respiratory issues.

### Mental Health Impacts of Extreme Heat

While the conversation about human health impacts is most often related to physical problems, such as respiratory and cardiovascular disease, extreme heat can also have a tremendous impact on mental health.

Heat waves can have a significant impact on mental health due to the stressful conditions it creates. Uncomfortable living conditions during a heat wave can cause heightened stress and anxiety. The prolonged exposure to extreme heat, especially when combined with limited access to cooling options, can lead to feelings of restlessness, irritability, and frustration.

High temperatures can disrupt sleep patterns, making it difficult to stay asleep. The lack of sleep can contribute to mood swings, fatigue, and difficulty concentrating, further impacting mental well-being. Finally, individuals may limit their outdoor activities and social interactions during heatwaves, leading to feelings of isolation, loneliness, and sadness, particularly for those who rely on outdoor activities or community engagement for their mental health.

Low-income populations are at greater risk of heat-related illnesses—both physical and mental—due to poor housing conditions, including lack of air conditioning and small, dense living spaces, and inadequate resources to find alternative shelter during a heat wave. Beyond those that lack air conditioning, lower income families, including fixed-income seniors, sometimes choose not to operate their air conditioning units due to rising energy costs. According to the US Census Bureau's American Housing Survey, about 9% of American households lack air conditioning, and nearly 12% of these households are below the poverty threshold.<sup>18</sup>

### Environment

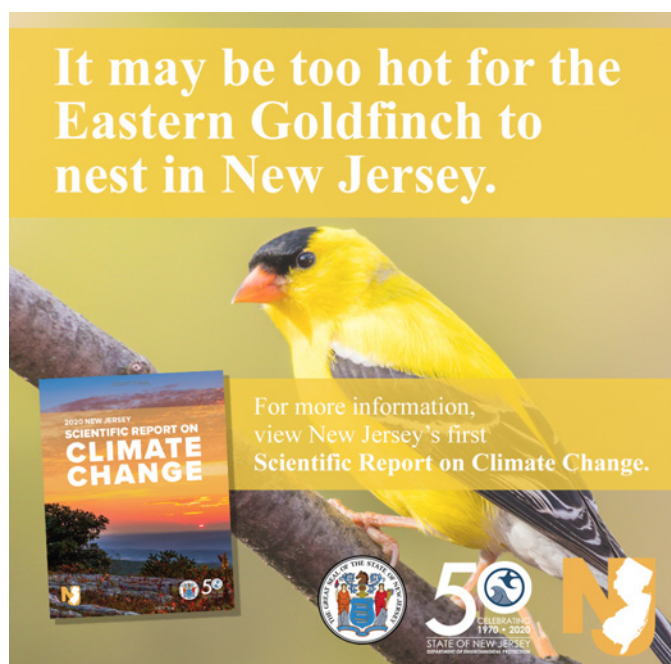
Increased temperatures, coupled with the degradation threats ecosystems already experience, threaten the vitality of ecosystems, crops, livestock, and the natural environment in general. Extreme heat will impact water quality, air quality, and biodiversity, and increase the potential for invasive species and other natural hazards such as wildfires and landslides. Over time, species and ecosystems may evolve and adapt to the shifting

temperatures, but this change may take decades. In the interim, understanding the potential impacts to ecosystems and the environment will help state agencies, communities, and individuals take steps to reduce the negative consequences of the changing climate. It is also critical, for the health and safety of all New Jerseyans, to recognize that heat is deadly for plants and animals, just as it is for humans. An increase in livestock mortality, fish kills, and a loss of biodiversity is projected for the state. Adapting to climate change requires action to reduce the prevalence of these impacts, but also strategies to respond if and when they do occur.

Higher temperatures result in warmer water in streams, lakes, and rivers. The warm water allows for some microbes, like cyanobacteria, to thrive, and potentially create conditions like Harmful Algal Blooms (HABs). As water warms up, its capacity for dissolved oxygen decreases compared to cold water. When HABs form they can block sunlight from aquatic plants, and as these plants and other organisms die, the bacteria in the water consume the oxygen rapidly. This sharp decline in oxygen and water quality can lead to impacts on aquatic life, particularly in the form of a phenomenon known as a fish kill, where different species of fish may be affected by the conditions in the water.

In addition to the other benefits they provide, forests

**Figure 10. New Jersey Scientific Report on Climate Change Social Media Campaign on Extreme Heat**



*“Extreme heat will impact water quality, air quality, and biodiversity, and increase the potential for invasive species and other natural hazards such as wildfires and landslides. Over time, species and ecosystems may evolve and adapt to the shifting temperatures, but this change may take decades.”*



*Sandy Hook Gateway National Recreation Area*

and other vegetation play a critical role in increasing human comfort during high heat events. Tree canopies provide shade that mitigate the threat of the direct sun on individuals in communities across the state. Vegetation along lakes, streams, and rivers help to reduce the water spiking during heat events. The impact from extreme heat on forests and plant communities is multifaceted. Forests and plants have grown accustomed to the state’s climate, which is why the species that thrive in New Jersey are different from those that adorn the landscape in Florida. When the temperature spikes to extreme levels, these species feel stress, and cope by drawing more water from the ground or reducing their growth. However, if the temperature increases too much or the heat wave lasts longer than they can endure, they may become diseased or die-off. The 2020 New Jersey Scientific Report on Climate Change reports that global-scale models do not anticipate plants to use more water than what will be available across the state. However, local models indicate that this balance between forests and drinking water supplies in the southern part of the state may be more perilous. Crops face the same potential threats of extreme heat as forests and other vegetation.

Additionally, higher temperatures allow non-native species to migrate and thrive. Such migration to the changing temperatures may not be innately bad for an ecosystem. However, newly introduced species can quickly overpopulate an area, competing with native species and depleting the overall biodiversity. These species, referred to as invasive species, can further stress ecosystems, threatening plants and animals both on the land and in the water.

### **An Urgent Need to Consider Extreme Heat**

Given the increasing concerns posed by extreme heat impacts in New Jersey, the Interagency Council selected this climate threat as the core theme for this, its first-ever Resilience Action Plan. This was especially important as the 2021 Climate Change Resilience Strategy focused primarily on building New Jersey’s resilience to flooding-related hazards, which meant that there was a gap in recommendations related to extreme heat resilience. The summer of 2022, only months following the original release of the Resilience Strategy, is now recognized as the third-hottest summer in New Jersey’s history, further affirming the urgent need to bring every agency working together on this issue to build the state’s resilience to extreme heat and its interrelated climate impacts.



## Summary of Engagement

### State Agency Staff Engagement

As the Extreme Heat Resilience Action Plan is a product of and for New Jersey state agencies to accelerate resilience efforts, there has been early and ongoing engagement of key staff from across many divisions, units, and program areas within New Jersey executive branch agencies. Agencies were provided a summary of potential actions specific to their roles and commitments for consideration that reflected the efforts from a literature review and research of other extreme heat plans and publications. This review and research resulted in the development of an extreme heat database of 170+ potential actions found from sister states, large cities, and leading research and policy development institutions focused on extreme heat resilience initiatives across the country. These materials served as fodder for facilitated conversations with staff from each of the 22 state departments and agencies that make up the Interagency Council. The network of senior representatives who make up the core membership of the Interagency Council were then tasked with reaching into their organizations to consider and identify a range of possible extreme heat resilience actions for inclusion in this plan.

Ideas and submissions from early brainstorming efforts proceeded through two rounds of further refinements to eliminate duplication of efforts, leverage synergies and opportunity for interagency coordination, and ensure a clear and consistent focus on matters most directly pertaining to extreme heat.

### Extreme Heat Advisory Group

The Interagency Council sought to utilize the expertise of national subject matter experts in heat resilience and climate resilience and adaptation thought leaders to supplement the knowledge and experience within the agencies, ensuring that the state agencies were considering a broad range of options and opportunities during the drafting of the RAP.

The Extreme Heat RAP Advisory Group consisted of subject matter experts with representation across a broad variety of interests and sectors, including professionals from academia, private consulting, non-governmental organizations (NGOs), and non-profits, many of whom served as municipal and state leaders over the course of their careers. Listed below, these talented individuals were convened to advise agencies on the development of the Extreme Heat RAP, providing a lens beyond that of state government to ensure that agencies were considering all angles of the extreme heat threat. The Advisory Group met with agencies throughout the Extreme Heat RAP development process to provide initial guidance, as well as advice on intermediate products and final drafts of the plan.

*“The Interagency Council sought to utilize the expertise of national subject matter experts in heat resilience and climate resilience and adaptation thought leaders to supplement the knowledge and experience within the agencies.”*

## Who is a Heat Impacted Stakeholder?



New Jersey state agencies have a variety of means and approaches by which they define overburdened communities, distressed communities, and areas in need of revitalization. These definitions help state agencies to focus limited resources on the areas of the state in greatest need of support for community and capital improvement.

When considering extreme heat, the Interagency Council recognizes the risks of urbanization in exacerbating the impacts of extreme heat in cities throughout New Jersey. However, most references to impacted stakeholders or vulnerable populations in this Plan refer to the individuals and families whose demographics and/or health status make them most likely to be hardest hit by extreme heat.

These vulnerable populations include seniors, pregnant and breastfeeding mothers, outdoor workers, those who spend a considerable amount of time outdoors, low-income families, and people with chronic health conditions.

## Extreme Heat Advisory Group Members

*Kathy Dolan*



Kathy Dolan is a Director of Environmental Health at the Association of State and Territorial Health Officials. For the past 12 years, she has worked public health practitioners across the country to develop strategies to address the health impacts of climate change and vector-borne diseases. She has written several articles on capacity building and policy interventions for state and territorial health officials to address the public health effects associated with climate change.

*Beth Gibbons*



Beth Gibbons is the Social Governance and National Resilience Lead at Farallon Strategies. Her current work includes developing and executing climate adaptation plans, strategies, and projects at multiple scales of government and across sectors. Beth previously served as the Executive Director of the American Society of Adaptation Professionals (ASAP). She is a contributing author to the Midwest Chapter of the 5th National Climate Assessment.

*Paula Hammond*



Paula Hammond is the National Transportation Market Leader for WSP USA, in Seattle, WA. Paula dedicated her 34-year public service career to improving transportation systems in Washington state and served as WA Secretary of Transportation from 2007-2013. She has been a national figure on transportation issues, with leadership on numerous AASHTO committees, TRB Executive Board, and is Immediate past Chair of ARTBA.

*Dr. Evan Mallen*



Dr. Evan Mallen is the Senior Analyst in Georgia Tech's Urban Climate Lab and co-founder of Urban Adapt, where he focuses on urban heat island mitigation planning, urban heat risk assessments, urban forestry and climate scenario modeling, and public health response with international public, private, and academic collaborators.

*Jacqui Patterson*



Jacqueline Patterson is the Founder and Executive Director of the Chisholm Legacy Project: A Resource Hub for Black Frontline Climate Justice Leadership. The mission of the Chisholm Legacy Project is rooted in a Just Transition Framework, serving as a vehicle to connect Black communities on the frontlines of climate justice with the resources to actualize visions. Ms. Patterson served as the Senior Director of the NAACP Environmental and Climate Justice Program for over a decade. Jacqueline Patterson is one of twelve 2024 TIME Women of the Year, a recognition of women who are working to build bridges towards a more equal world.

*Mark Rupp*



Mark Rupp previously served as Georgetown Climate Center's Adaptation Program Director, leading the adaptation team, and providing strategic direction for its work in support of resilience, equity, and community-based solutions at the local, state, and federal levels.

*Dr. Vivek Shandas*



Dr. Vivek Shandas is a Professor in the Department of Geography at Portland State University. Dr. Shandas is an interdisciplinary scholar whose expertise is in climate change, urban heat and health, environmental justice, air quality management, green infrastructure, and spatial mapping. His teaching and research examine the intersection of exposure to climate-induced events, governance processes, and planning mechanisms.

*Kathryn Zyla*



Kathryn Zyla is the Executive Director of the Georgetown Climate Center, where she oversees the Center's work at the nexus of climate change and energy policy, supervising staff and student work on climate mitigation and adaptation at the state, federal, and local levels. She is also a senior lecturer at Georgetown University Law Center and faculty advisor for the student Georgetown Energy Law Group. She has served as a Commissioner on the District of Columbia's Commission on Climate Change and Resiliency since 2017.



## Public Outreach

As this was the first Resilience Action Plan developed by the Interagency Council, the initial phase of engagement for this plan included the development and public release of a Scoping Document which provided an overview for how a Resilience Action Plan would align with and build upon the Resilience Strategy. Released in January 2023, the Scoping Document provides a high-level description of the purpose, process, and intent of a Resilience Action Plan. For more information, please visit <https://dep.nj.gov/climatechange/resilience/resilience-strategy/>.

At the same time, the Interagency Council produced a survey designed to capture stakeholder feedback regarding the Resilience Strategy, and efforts of the executive branch to advance resilience action at the statewide and local levels, and—importantly—focused questions regarding the needs and wants, concerns, and opportunities New Jerseyans saw for state action to combat extreme heat and advance statewide resilience.

In February and March of 2023, the DEP Office of Climate Resilience hosted a two-part series of public webinars, providing a presentation on the state’s intended approach for developing Resilience Action Plans as well as a summary of the ways in which extreme heat impacts New Jersey’s people, built environment, and natural systems.

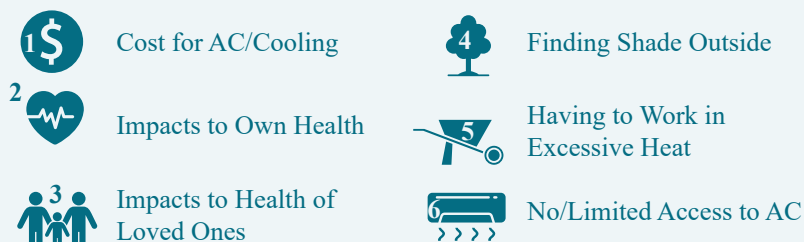
The core purposes of the survey and webinar conversations in the early stages of the development of this plan were two-fold: garnering public input regarding the Interagency Council’s proposed direction in preparing resilience action plans on specific climate concerns and threats and seeking to understand the key issues named by members of the public with regard to extreme heat impacts in New Jersey.

## Targeted Outreach to Impacted Stakeholders (Spring 2023)

While anyone can suffer from a heat-related illness, several specific populations are more vulnerable to extreme heat and susceptible to heat-related illnesses. Over the spring and early summer months, broad-based public engagement efforts were further supplemented by targeted outreach sessions focused on capturing the informed feedback of staff and leadership in organizations serving and advocating for the needs of stakeholders that are particularly hard-hit by extreme heat. These vulnerable populations include seniors, pregnant and breastfeeding mothers, outdoor workers, those who spend a considerable amount of time outdoors, low-income families, and people with chronic health conditions. In recognition that State action must necessarily be complementary to municipal and county-scale interventions, the Office of Climate

## 2023-2024 EXTREME HEAT SURVEY RESULTS

### Top Extreme Heat Concerns Selected by Respondents:



### Top Extreme Heat Concerns That Trigger Other Threats/Challenges Selected by Respondents:



### Information on Respondents

- 43% of respondents struggle to keep their homes cool during a heat wave at least occasionally
- For 38% of respondents, heat at least occasionally affects the mode of transportation they choose to use
- 12% of respondents that are employed work outdoors or indoors without air conditioning
- Excessive heat has affected respondents at the workplace the most by causing them to drink more water to stay hydrated and by causing more frequent breaks

  
3,831  
Total  
Respondents

## 2023-2024 EXTREME HEAT SURVEY RESULTS (CONT.)

### Top Affects of Extreme Heat to Participants:



Cost



Discomfort



Environmental Conservation

### Extreme Heat Most Affects Respondent's Family Activities by:

- Adjusting schedules to be outside while it's less hot
- Taking more frequent water breaks
- Change activities to lower intensity activities in places that are cooler (e.g., shade, air conditioning, beach, pool)
- Recreational activities taking place outside are either cancelled or rescheduled

### Top Existing Community Amenities Identified by Respondents:

- Parks/greenspace that have shade
- Street trees
- Shade structures in playgrounds and parks
- Free places for air conditioning
- Water fountains/water bottle stations
- Recreational water features

### Top Desired Community Amenities by Respondents:

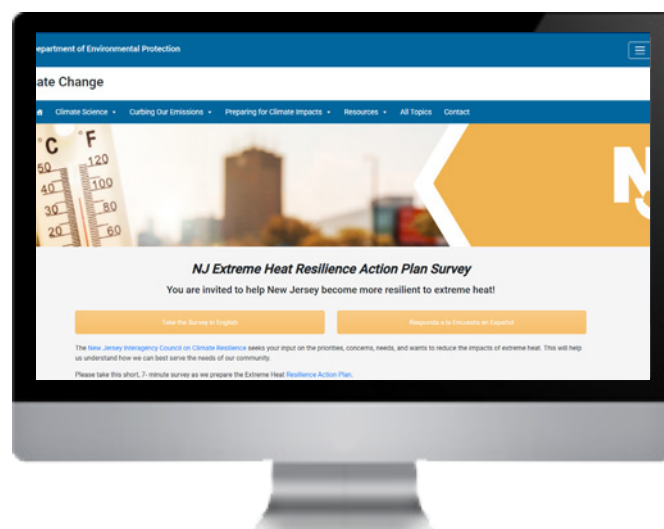
- Free Wi-Fi/Electricity Access
- Recreational Community-building or Learning Events and Activities
- Free Water Stations
- Children's Activities
- Near Mass Transit

Resilience also hosted a webinar in partnership with the New Jersey League of Municipalities in June 2023.

### Extreme Heat Survey

In the winter of 2024, the State released a second survey, which generated feedback from over 3,800 New Jerseyans. Details regarding the survey feedback are interwoven throughout this plan and summarized in brief above. The goal of the Interagency Council in disseminating this survey was to better understand how extreme heat affects New Jerseyans at home, at work/school, and in recreational settings. Respondents were also asked to share, in their own words, how extreme heat has affected them, and to identify the degree of importance they associated with a variety of policy and programmatic interventions, and areas of greatest concern. Survey findings are summarized in the graphics on page 17 and 18.

Figure 11. DEP's Website with the Extreme Heat Survey



**3,800+**  
*Extreme Heat Survey Responses*



### What's Next?

The Extreme Heat Resilience Action Plan is intended to describe the actions state agencies will take to increase New Jersey's resilience to extreme heat. As foundational documents, the Scientific Report and Resilience Strategy establish the scientific basis and overarching policy framework for addressing climate change in New Jersey. This Plan takes matters a step further by identifying the actions state agencies and departments can take to better equip New Jersey to withstand climate change's impacts. While each agency is different, the actions included herein consider how extreme heat affects agency decision-making. The selected interventions capture opportunities for advancing or accelerating implementation of actionable interventions for improving resilience outcomes of policy, procedures, programs, authorities, legislation, permitting requirements, funding criteria, capital programs and projects, data and research initiatives, and regulation.


### Monitoring Progress

The actions identified in this Resilience Action Plan will serve as living examples of how New Jersey state agencies and departments will implement the vision laid out in the Resilience Strategy. As state and local leaders grapple with any uncertainties at the core of planning for changing climate, it will be imperative that they do so with an eye towards continuous improvement. While government agencies have deep experience managing

resources, staffing, and infrastructure through myriad changes and transitions, resilience planning calls for an intentionally iterative, transparent, and collaborative form of monitoring and evaluation that feeds newly available information and on-the-ground lessons back into program and policy design and development. The Interagency Council will seek to monitor the status and effectiveness of actions, allowing an opportunity to evaluate performance, and improve or revise programs on an on-going basis. This will include regular updates about implementation progress with the public and key stakeholders.

### Author's Note

Starting with the 2021 release of the International Panel on Climate Change's (IPCC) Sixth Assessment Report, the international community of climate scientists have transitioned to Shared Socioeconomic Pathways (SSPs) to derive a shared understanding of greenhouse gas emissions trajectories under five different climate policy scenarios. These range from SSP1: Sustainability ("Taking the Green Road") to SSP5: Fossil-fueled Development ("Taking the Highway"). Many of the references listed below rely on data derived from Representative Concentration Pathways (RCPs) adopted by the IPCC in 2014 to describe projected future greenhouse gas concentrations. While the label for predicted concentrations has changed, each SSP has an anomalous RCP, making for a smoother transition to the more socially conscious methodology.



*"Given the increasing concerns posed by extreme heat impacts in New Jersey, the Interagency Council selected this climate threat as the core theme for this, its first-ever Resilience Action Plan."*

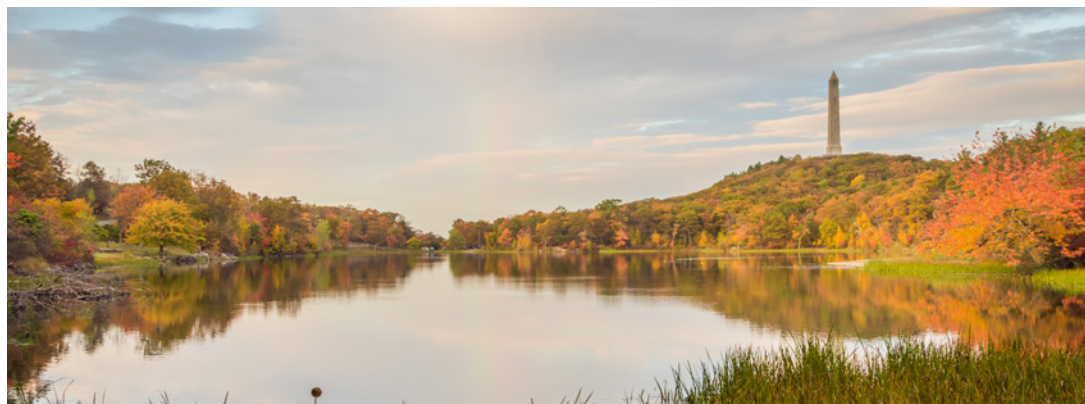
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**PRIORITY 1:**  
**BUILD RESILIENT AND**  
**HEALTHY COMMUNITIES**







Priority 1 of the Climate Change Resilience Strategy, *Build Resilient and Healthy Communities*, emphasizes the importance of centering the health and wellbeing in New Jersey towns and cities and increasing their resilience through various measures designed to help municipalities lessen or better cope with the impacts of climate change. Extreme heat is at the forefront of these impacts and therefore poses a tangible threat to New Jerseyans.

While it is understood that extreme heat, like other climate change-driven hazards, is a global issue, it is at the local level that impacts are felt and managed. Local governments must plan for and prepare against the impacts to their communities, including their residents, infrastructure, economies, and natural resources. The effect of extreme heat on human health is one of the greatest concerns as temperatures continue to trend upward, and the new normal we see presents more and more life-threatening conditions. Maintaining healthy and resilient communities in the face of these conditions is of the utmost importance. It is critical that the state agencies that ultimately serve these communities provide them with the resources and services to help them effectively prepare for and respond to increasing high temperatures.

Efforts to protect human health are a priority at the state level, as exemplified in the actions throughout this chapter. Actions within this section seek to address concerns such as public health, the health and safety of workers, and emergency response. Additional actions address the need for community resources, including cooling centers, and residential cooling needs, such as access to air

conditioners and affordable utilities. Housing authorities and agencies providing community services seek to update and enhance building codes and promote increased use of and access to green space and infrastructure. Meanwhile, transportation agencies are considering interventions that provide infrastructure for safer and cooler transit, as many New Jersey residents live in urban areas and rely on those systems.

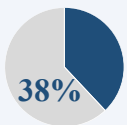
There is an intentional focus on vulnerable populations in this chapter, as we know they are often most impacted by high heat situations and most in need of resources and assistance. Concerns related to the density of urban development in New Jersey also inform actions in this chapter surrounding urban heat islands and tree canopy cover, with efforts to provide shade and decrease impervious surfaces. Additionally, impacts to resources such as drinking water quality and supply and recreational spaces and activities are herein considered.

Local governments bear great responsibilities with often limited capacity, and so many of the actions in this category are targeted at increasing their capacity and providing services, tools, and funds to assist municipal and regional bodies. Using a range of methods from changes in land use and zoning, to providing physical infrastructure and community programs, the state is seeking to bolster the capabilities of communities and advance the original intentions of this Strategy priority. Integrating extreme heat into local decisions with support from state programs and resources will allow for better preparation and more resilience in a hotter future.

## 2023-2024 EXTREME HEAT SURVEY RESULTS



43% of respondents struggle to keep their homes cool during a heat wave at least occasionally.



38% of respondents say heat affects their mode of transportation at least occasionally.

### Top Existing Community Amenities Identified by Respondents that Provide Relief During Heat Events:



Parks/Greenspace with Shaded Areas



Street Trees



Free Places for Air Conditioning

### Top Activities or Features that Would Increase Cooling Center Usage:






1. Free Wi-Fi/Electrical Access (1,281 votes)
2. Recreational Community-building or Learning Events and Activities (1,181 votes)
3. Free Water Stations (969 votes)
4. Children's Activities (520 votes)
5. Near Mass Transit (342 votes)
6. Wheelchair Accessible Location (223 votes)








## Emergency Preparedness & Response (EPR)

### EPR ACTIONS

Number	Name	Status
<b>EPR-1</b>	Expand and Support Hazard Mitigation Planning and Broad-based Education around Extreme Heat as a Climate-Related Hazard	
<b>EPR-2</b>	Continue Funding Rutgers for Development of HazAdapt Suite	
<b>EPR-3</b>	Encourage County-Level Extreme Heat Planning Focused on the Needs of Seniors	
<b>EPR-4</b>	Apply for Federal Funds for Extreme Heat Resilience and Mitigation Projects	
<b>EPR-5</b>	Coordinate Heat Awareness and Risk Communication Across Agencies	
<b>EPR-6</b>	Expand Register Ready Sheltering Support	
<b>EPR-7</b>	Strategically Deploy Back-Up Power Support at Community Lifeline Facilities	
<b>EPR-8</b>	Ensure Grid Resilience at DMAVA Facilities	

#### Action Key:

 Recommended  Ongoing/Underway  Completed



Warren Grove Wildfire

Extreme heat events are becoming more intense and frequent as a result of climate change and taking an increasing toll on health and infrastructure across the state. Heat waves send New Jersey residents to the emergency room with increased risks of heart and respiratory problems, and especially endanger our most vulnerable populations such as children, seniors, people with underlying health conditions, and underserved and overburdened communities. Many state and local organizations are responsible to plan for, and respond to, natural hazards such as extreme heat.

As part of emergency preparedness, the state and county governments create hazard mitigation plans that assess vulnerabilities to natural hazards such as extreme heat, better understand emergency response capabilities, and facilitate implementation of identified mitigation strategies. Mitigation actions on a local or regional scale can reduce impacts from extreme temperatures and help save lives, protect infrastructure, reduce energy demands, improve work productivity and community comfort. Preparedness also includes ensuring that the proper communication channels are in place prior to an emergency. Effective communication of heat risk across agencies, and between scientists, decision makers, and the public improves overall response. Communications

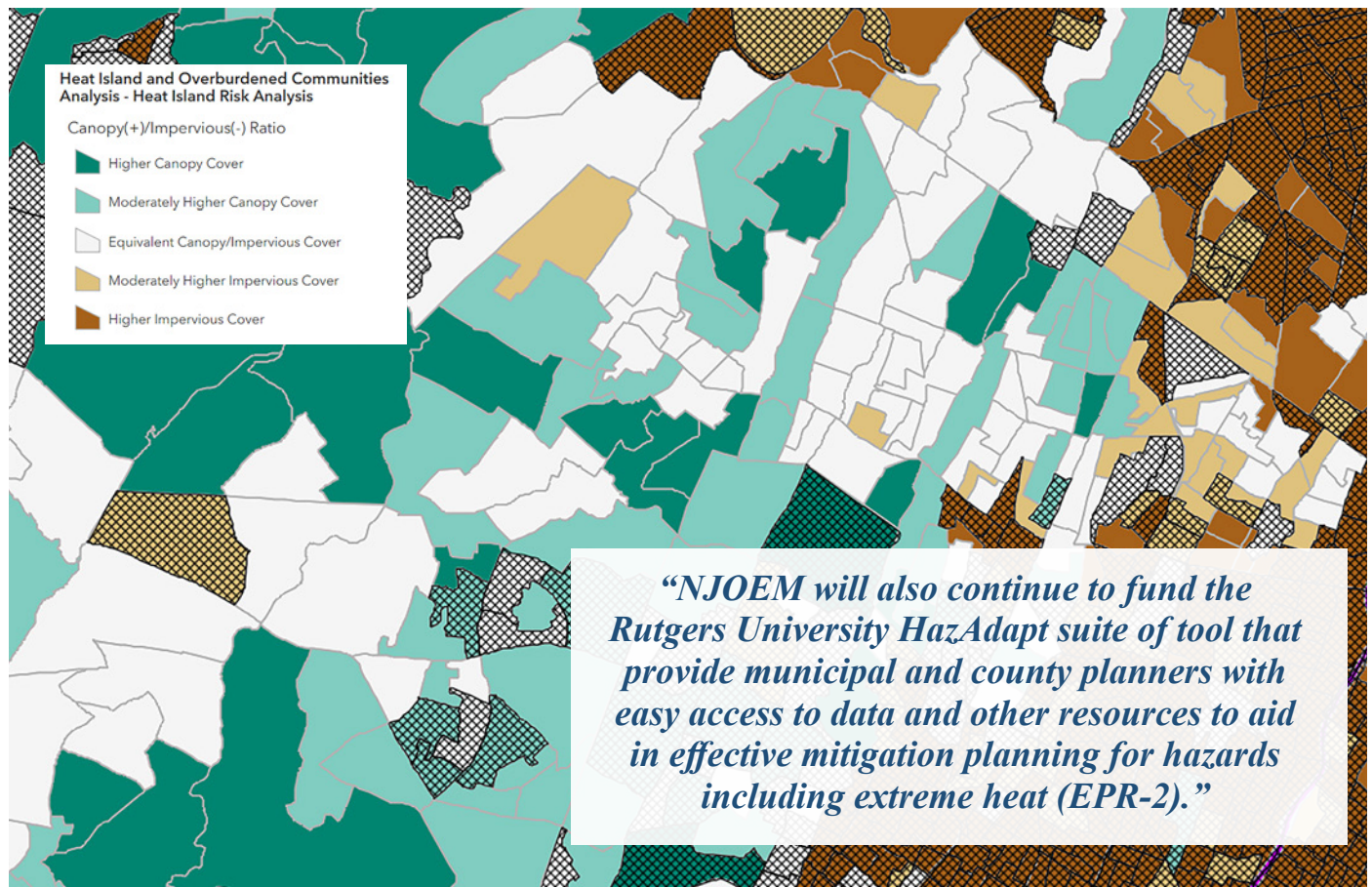


such as emergency warnings and information on how to stay cool can prevent heat-related illness or death by increasing awareness of risk and potential prevention options.

While mitigation of extreme heat events is important, it is impossible to avoid them altogether. Effective emergency response can help prevent heat-related illness and deaths and reduce the overall impact of excessive heat conditions. For that reason, it is important to have robust emergency response plans and protocols before extreme heat conditions occur. Readiness actions must begin when high temperatures are forecast rather than when they arrive. Unfortunately, warnings about dangerously hot days do not elicit the same response as floods, fires, and typical disaster scenarios, requiring intentional and strategic pre-event planning.

The programs and authorities on the Interagency Council responsible for emergency preparedness and response have identified eight actions to ensure that the state's processes anticipate and respond to changing climatic conditions.

***“Mitigation actions on a local or regional scale can reduce impacts from extreme temperatures and help save lives, protect infrastructure, reduce energy demands, improve work productivity and community comfort.”***







## PRIORITY 1: BUILD RESILIENT AND HEALTHY COMMUNITIES



*“NJOEM will strategically deploy back-up power support at community lifeline facilities. This effort will build grid redundancy and sheltering capabilities, with prioritization for underserved communities (EPR-7).”*

Kearny Power Station

### Planning for Extreme Heat

The first set of actions expands and supports hazard mitigation planning for extreme heat. The New Jersey Office of Emergency Management (NJOEM), the state’s chief agency in charge of emergency preparedness and response, will continue to expand and support actions that address extreme heat through multi-jurisdictional hazard mitigation planning in alignment with state and federal policies and goals (EPR-1). NJOEM will also continue to fund the Rutgers University [HazAdapt](#) suite of tools that provide municipal and county planners with easy access to data and other resources to aid in effective mitigation planning for hazards including extreme heat (EPR-2).

Additionally, the Department of Human Services (DHS) seeks to encourage county-level extreme heat planning focused on the needs of seniors. Through this action, DHS will leverage their network of Area Agencies on Aging in collaboration with NJOEM and their network of county offices of emergency management on the preparation of county-specific extreme heat plans that address the needs of older adults during extreme heat events (EPR-3). The Department of Community Affairs (DCA) will actively and intentionally pursue and apply for additional federal funding that enables municipalities to propose projects related to extreme heat resilience and hazard mitigation (EPR-4).

### Coordinating Communications for Heat Events

The second set of actions concentrates on communications leading up to and during extreme heat emergencies. NJOEM will work to coordinate emergency event notifications and warnings in the event of a heat related emergency (EPR-5). The Department of Human Services (DHS) will expand the use of the NJ Register Ready - Special Needs Registry to empower first responders with critical information about residents with disabilities or access and functional needs so they can better plan to serve those individuals in an extreme heat emergency (EPR-6).

### Build Power Redundancy for Critical Facilities

The last two actions related to Emergency Preparedness and Response seek to ensure resilience of critical systems and power redundancy through back-up power systems at critical facilities. NJOEM will strategically deploy back-up power support at community lifeline facilities. This effort will build grid redundancy and sheltering capabilities, with prioritization for underserved communities (EPR-7). Additionally, the Department of Military and Veteran Affairs (DMAVA) will work towards the state’s goal of building electrification and ensuring resilience of utilities at its facilities when off-site power is not available (EPR-8).



## Cooling Centers (CC)






The activation of cooling centers during extreme heat weather emergencies is widely considered a cost-effective extreme heat response strategy. This includes identification and promotion of publicly available places people can go to seek refuge from the heat, in some cases even without the need for the declaration of a dangerous heat wave. Using existing community facilities, such as libraries or community centers that are already maintained is less resource intensive than staffing and operating an official cooling center.

The task of providing regularly available and accessible cooling centers falls under the purview of emergency management and key disaster response partners, such as those traditionally tasked with providing temporary shelters during severe weather events. In New Jersey, the implementation of these functions falls to county and local Offices of Emergency Management (OEM) throughout the state. However, the activation of cooling centers is not required by legislation or mandate at this time.

While New Jersey does not currently require the designation and activation of cooling centers during extreme heat events, a bill currently moving through the state legislature would create a “Code Red” pilot program requiring local offices of emergency management to shelter at-risk individuals during hot weather. Given the geographic variability in weather conditions, as well as the diversity of population needs across New Jersey, many other actors can also be involved in setting up temporary extreme heat relief sites, serving as de facto cooling

### CC ACTIONS

Number	Name	Status
CC-1	“Chill Out NJ” Mapping of Places to Beat the Heat	
CC-2	Cooling Center Locator & Awareness Building Campaign	
CC-3	Expand Network of Local Cooling Sites and Provide Support to Operators	
CC-4	Develop Code Red Program*	

Action Key:



Recommended



Ongoing/Underway



Completed

\* Status is TBD, pending legislation





*Newark, NJ*



sites in the absence of an official emergency cooling center activation. In communities where local emergency response capacity is limited and/or where the needs of vulnerable populations are high, these community-run relief centers could be the difference between temporary, life-saving relief for an at-risk individual and another individual visiting the emergency room due to heat-related illness.

The following commitments by members of the New Jersey Interagency Council on Climate Resilience demonstrate a mix of approaches to advancing consistency and quality in the statewide network of places to stay cool.

### **Build Awareness of and Expand Network of Places to Stay Cool**

To help the public better understand the range of available places where they can cool down, various organizations have collaborated to identify places managed by existing associations and networks (including libraries, senior centers, etc.) poised to provide air-conditioned places during very hot summer days (CC-1). This information has been compiled into a map-based platform, called “Chill Out NJ” designed for widespread public dissemination via Heat Hub NJ (see COM-8). To ensure that this statewide map and communications surrounding it do not duplicate or otherwise get confused with information about emergency

cooling center activations led by counties and localities, this map aims to supplement (not duplicate) public-facing emergency event communications regarding with cooling center availability. To that end, Chill Out NJ includes a year-round compilation of places New Jerseyans can visit to seek relief from the heat such as shaded parks and green spaces, libraries, and pools and spray parks as well as a dedicated email inbox for crowdsourcing additional ideas for places to list on Chill Out NJ.

In future iterations, however, collaborators will aim to develop a one-stop interactive online search and mapping “locator” tool that displays time-limited information from county and local offices of emergency management including up-to-date information about cooling center emergency activations (such as hours of operation, handicap accessibility, etc.) (CC-2).

State agency partners will be able to use the mapping from the prior two activities to identify gaps in network coverage and then increase the number of cooling sites where they are most needed for vulnerable populations. Where necessary and possible, this will enable state agencies to target increased engagement from local partners such as non-profit and faith-based organizations in communities with high heat vulnerability and determine where and how the state can lend support by directing assistance with site accessibility, funding assistance to



support backup power generation, and other efforts by directing funding and technical assistance to support backup power generation, and other efforts to increase accessibility and utility of cooling centers to the general public during extreme weather events (CC-3).

### Develop a Code Red Program

New Jersey does not currently require the designation and activation of cooling centers during extreme heat events. Vulnerable populations (for example, the elderly and those on limited incomes, infants and children, pregnant people, and those without air conditioning) may require emergency cooling centers to be activated during extreme heat events. In the absence of a legislative mandate and accompanying guidance to ensure consistency across the state, county, and local OEM offices are left to provide cooling centers in an ad hoc and uncoordinated manner that undermines our inherent goal of ensuring equitable protection for vulnerable people throughout New Jersey. A bill being considered by the State legislature would create a limited “Code Red” pilot program to shelter at-risk individuals during hot weather. The legislation mirrors the existing “Code Blue” activation mandate. It would establish a consistent mechanism for alerting county and local OEM offices to activate cooling centers based on National Weather Service forecasts (CC-4).

### 2023-2024 EXTREME HEAT SURVEY RESULTS

#### How Respondents’ Cool Down During a Heat Wave:

*“Living in a coastal community there is access to water (ocean, bay and river beaches) to cool off...”*

31 Comments Related to  
Bodies of Water

*“Generally, move indoors to AC or stay outside and do low-energy things in shade or at pools/beach.”*

70 Comments Related to Lower  
Intensity Activities in Cooler Places











Rahway, NJ








## Housing and Residential Cooling Support (HRCS)

### HRCS ACTIONS

Number	Name	Status
<b>HRCS-1</b>	Conduct Study on Air Conditioning Access in NJ	
<b>HRCS-2</b>	Ensure Ratepayers Are Informed of Cost-Saving Programs	
<b>HRCS-3</b>	Promote Energy Efficiency and Decarbonization Improvements for Low-Income Households Programs	
<b>HRCS-4</b>	Implement Whole House Initiative	
<b>HRCS-5</b>	Continue Implementation of the Winter Termination Program	
<b>HRCS-6</b>	Low-Income Home Energy Assistance Program – Medically Necessary Cooling	
<b>HRCS-7</b>	Ensure Efficient and Cool New Affordable Housing	
<b>HRCS-8</b>	Meet Green and Resilient Building Standards During Disaster Recovery	

#### Action Key:

 Recommended    Ongoing/Underway    Completed



Monmouth Junction, NJ

During an extreme heat emergency, it is recommended that people stay indoors as much as possible and use cooling technology such as air conditioning to avoid the health impacts of high temperatures. New Jersey's agencies responsible for housing, environment, and energy have identified 12 actions to ensure that residents have access to energy efficient housing, cooling technology, and other related resources. These actions will facilitate safe indoor air temperatures which allow people to remain safe and comfortable in their own homes during periods of extreme heat.

### Understanding Access to Residential Cooling

From November 2023 to February 2024, the state administered the New Jersey Resilience Action Plan Extreme Heat Survey which received input from nearly 4,000 New Jerseyans on the ways in which extreme heat affected them and their families. Although most households in the state (approximately 70% of survey respondents) have access to air conditioning, many do not. That said, 43% of respondents struggle at least occasionally to keep their homes sufficiently cool during periods of excessive heat. Lack of air conditioning can be problematic because more accessible technologies such as fans are insufficient for cooling at extreme high temperatures.






Temperatures in buildings lacking air conditioning can sometimes exceed outdoor temperature during a heatwave. To better understand the extent of exposure for this issue, the Department of Environmental Protection (DEP) will analyze access to air conditioning throughout the state to determine where residential cooling interventions are most needed (HRCS-1).

For those who do have access to air conditioning, paying for additional energy to run it is problematic, especially for many low-income individuals. Many may not turn on air conditioning due to increased utility bills which may lead to illness and even death. Over 500 respondents (representing nearly 15% of survey takers) indicated that they “Always” or “Very frequently” struggle to keep their homes cool during periods of excessive heat, even though 41% of these respondents had previously indicated that their home had central air conditioning, and 49% use window units. When asked to rate their degree of concern about a variety of factors during intense heat waves, 77% of those who struggle to keep their homes sufficiently cool noted that the cost of air conditioning was “very” or “extremely worrying.” For this reason, the following set of actions will improve energy efficiency and reduce or assist with energy costs for low-income households.

### Improve Utility Affordability

The Board of Public Utilities (BPU) has identified several actions in this focus area, reflecting programs to increase utility affordability that are already in place. The BPU will continue working with other agencies, nonprofits, regulated utilities, and others to ensure that ratepayers understand and utilize all options available to them to reduce monthly utility bills, especially during extreme weather events such as heat waves (HRCS-2).

### HRCS ACTIONS (CONT.)

<i>Number</i>	<i>Name</i>	<i>Status</i>
<b>HRCS-9</b>	Incentivize Extreme Heat Assessments and Heat-Resilient Building Criteria in National Building Programs	
<b>HRCS-10</b>	Identify Design Enhancements to Qualified Allocation Plan “Green Points” to Combat Extreme Heat	
<b>HRCS-11</b>	Identify Heat Exposure and Disseminate Cooling Strategies to HMFA-financed Portfolio Projects	
<b>HRCS-12</b>	Mitigate Extreme Heat Conditions in Juvenile Justice Facilities	

Action Key:



Recommended



Ongoing/Underway



Completed





## PRIORITY 1: BUILD RESILIENT AND HEALTHY COMMUNITIES

BPU will continue to promote programs that offer efficiency rebates (the Inflation Reduction Act Home Efficiency Rebate (HOMES) program) and home electrification and appliance rebates (the High-Efficiency Electric Home Rebate Act (HEEHRA) program) for low-income households (HRCS-3). Additionally, BPU will implement a new program called the Whole House Initiative. “Whole House” refers to a holistic approach to healthy housing that incorporates remediation of health and safety hazards along with energy efficiency improvements (HRCS-4). This action will focus on low- to moderate-income residents and could make significant contributions to making homes safer and more energy efficient, including in urban areas.

While these actions will seek to reduce energy costs to ensure the ability of residents to stay cool, there are still those who may fall behind on their utility bills, or who may need assistance to ensure they turn on their air conditioners to ensure their family’s health and well-being during extremely hot conditions. The Winter Termination Program prohibits a local authority, municipal utility or rural electric cooperative from discontinuing service to eligible residential customers from November 15 to March 15. The program is designed to prevent the disruption of utility services (including electric, sewer, and water service) for residents who are experiencing trouble paying their bills during the cold winter months. BPU ensures that utility shutoffs are also prevented on days over 95°F, regardless of ability to pay, so that no New Jerseyans have their power affected during a heat wave (HRCS-5).

Similarly, the Low-Income Home Energy Assistance Program (LIHEAP) helps very low-income residents with their heating and cooling bills. While this federally funded program was originally designed with extreme cold in mind, it also contains a “medically necessary cooling assistance” segment, which allows qualifying families (i.e., those earning less than 60% of the State median income for their family size) with a doctor-verified need for cooling to receive assistance towards electrical costs (HRCS-6).

### **Retrofit and Design Housing for Cooling**

The next set of actions is focused on construction standards, codes, and design to improve efficiency and resilience of existing and newly constructed housing to extreme heat.

The Department of Community Affairs (DCA) runs and manages a wide range of programs to assist in the development of low- and moderate-income housing. These programs ensure new affordable housing construction is cool and efficient through requirements such as Energy Star certification, central air conditioning, and modern construction standards (HRCS-7). DCA will also ensure new and substantially improved homes constructed with funding from disaster recovery programs meet federal Green and Resilient Building Standards, which require structures to be better insulated and more energy efficient (HRCS-8).

New Jersey Housing and Mortgage Finance Agency (HMFA) has enhanced its “green points” policy to require site and risk assessments in new affordable housing construction projects that utilize federal Low-Income Housing Tax Credits, and will explore explicitly requiring extreme heat assessments and review of heat-resilient building criteria (HRCS-9).

HMFA periodically updates its Qualified Allocation Plan, which defines rules, standards and procedures for the Low-Income Housing Tax Credit program. As new data on the need for and effectiveness of resilience interventions becomes available, the “green points” can be modified to address emerging barriers or concerns related to extreme heat. To that end, HMFA’s Division of Technical Services will consider heat vulnerability when providing design review of proposed projects, seeking opportunities to incorporate best practices for residential cooling and mitigating heat island effects (HRCS-10).

The final set of actions in this focus area relate to improving heat resilience in state-financed or state-managed housing facilities. HMFA will identify populations vulnerable to heat exposure in HMFA-financed housing projects located within heat islands to help educate facility managers and residents about on-site heat mitigation strategies (HRCS-11).

Finally, the Department of Law and Public Safety has been making upgrades to juvenile justice facilities including replacement of decades old HVAC units with high efficiency air conditioning units, increased use of insulation and cool roof design, and amenities such as gazebos, misters, and trees to facilitate outdoor visitation even during an extreme heat event (HRCS-12).



## Worker Safety & Workplace Heat Illness Prevention (WS)



By federal law, all employers are required to ensure that their workplaces are free of known safety and health hazards, including extreme heat. This means that employers across the nation are responsible for monitoring employees for signs of heat illness; providing water, rest, and shade; and planning for and training employees about the risks associated with extreme heat. In the absence of corresponding state legislation or jurisdictional authority, however, New Jersey worker safety protections against extreme heat are inadequate to protect the most vulnerable and highly exposed workers.

In both 2023 and 2024, a coalition of state Offices of Attorney Generals called on the Occupational Safety and Health Administration (OSHA) and the Biden Administration to enact an emergency extreme heat standard in advance of years with predictions of dangerous summer heat. The 2024 petition called on Congress to pass pending legislation which directs OSHA to advance an interim heat standard. In the absence of a federal mandate, and clear guidance on the enforcement of extreme heat and workplace heat illness prevention actions, states must operate under the existing regulatory authority granted through the Occupational Safety and Health Act of 1970 (OSH Act).

### WS ACTIONS

Number	Name	Status
<b>WS-1</b>	Development of Interagency Guidance & Resource Compilation for Workplace Heat Illness Prevention	
<b>WS-2</b>	Protect Military Personnel from Extreme Heat Exposure	
<b>WS-3</b>	Develop Workplace Standards to Protect Workers in Extreme Heat Conditions*	
<b>WS-4</b>	Coordinate Outreach and Education Improve Outdoor Worker Safety in the Agriculture Sector	

Action Key:



Recommended



Ongoing/Underway



Completed

\* Status is TBD, pending legislation





## PRIORITY 1: BUILD RESILIENT AND HEALTHY COMMUNITIES

The OSHA Act allows states and territories to assume some of OSHA's responsibilities as long as they're "at least as effective" as the federal version. There are currently 22 state plans covering both private sector and state and local government workers, and seven state plans covering only state and local government workers. New Jersey operates an OSHA-approved State Plan covering only state and local government workers. Private sector employers and their workers are covered by federal OSHA. The New Jersey Public Employees Occupational Safety and Health Act is administered by two departments. The New Jersey Department of Labor and Workforce Development (NJDOLE) is responsible for administering and enforcing the Act throughout the state and investigates complaints regarding safety hazards in the public sector workplace. Meanwhile, the New Jersey Department of Health (NJDOH) investigates complaints regarding health hazards in the public sector workplace, including the

New Jersey indoor air quality standard. State agency commitments related to worker safety and heat illness prevention are organized into two categories, the first of which is focused on the employees of state agencies themselves, and the second of which considers specific actions for military personnel and agricultural workers.

As New Jersey faces another summer of extreme heat, the State should seize the opportunity to pass a law establishing an occupational heat stress standard and heat-related illness and injury prevention program. States including California, Colorado, Minnesota, Oregon, and Washington have already adopted standards that go beyond the federal OSHA standards in order to provide better protections to workers in extreme heat. We must ensure that our regulations meet the needs of workers while simultaneously assuaging the needs and concerns of business owners.

### U.S. Department of Labor Occupational Safety and Health Administration

The U.S. Department of Labor (DOL) Occupational Safety and Health Administration (OSHA) works to ensure safe and healthful working conditions for workers by setting and enforcing standards and by providing training, outreach, education and assistance across a range of workplace hazards and health threats. Recognizing the dire harms caused by extreme heat, in July 2023, President Biden asked the DOL to issue a first-ever heat hazard alert (Figure 1) to remind employers of their obligation to protect workers against heat illness or injury, and to ramp up OSHA's enforcement actions to protect workers from extreme heat.



That said, DOL's initiatives on this topic began with OSHA's advanced notice of proposed rulemaking to consider a heat specific workplace standard, published in the federal register in October 2021. The advanced notice of proposed rulemaking triggered the launch of a "National Emphasis Program" (NEP, a temporary program that focuses OSHA's resources on a particular hazard and high-hazard industries) and a Heat Injury and Illness Prevention Work Group tasked with the development and dissemination of guidance materials and recommendations. The DOL's NEP instruction to protect employees from heat related hazards was issued April 2022; and the Work Group's recommendations on potential elements of a proposed heat injury and illness prevention standard were finalized May 2023.

Both efforts summarize the need for employers to develop an exposure control and heat illness prevention plan, offer training, engage in environmental monitoring, and implement certain measures to control the impacts of high heat and extreme heat days (including providing water, breaks and shade and being intentional about helping workers to acclimatize to weather conditions).

Unfortunately, there is no clear timetable for the publication of the proposed rule or proposed heat injury and illness prevention standard at the time of the release of the New Jersey Extreme Heat Resilience Action Plan. It is likely that federal-level decision-makers await review of key fact-finding, public comment and stakeholder engagement efforts to ensure the enforceability of a proposed heat standard. The NEP is designed to evaluate inspection findings (including injury and illness data) alongside National Institute for Occupational Safety and Health (NIOSH) reports, peer-reviewed literature, and other available information sources to ensure the enforceability of a proposed rule and heat standard.



Figure 12. OSHA's Hazard Alert Summarize Employer Responsibilities to Protect Workers from Extreme Heat: U.S. Department of Labor

## Employers are Responsible for Protecting Workers from Heat Illness

By law employers are responsible for providing workplaces free of known safety hazards, including extreme heat.

It is your responsibility to:

- ☒ Provide workers with water, rest and shade.
- ☒ Allow new or returning workers to gradually increase workloads and take more frequent breaks during the first week of work as they build a tolerance for working in the heat.
- ☒ Plan for emergencies and train workers on prevention.
- ☒ Monitor workers for signs of illness.

[osha.gov/heat](https://osha.gov/heat)



### Develop Interagency Guidance

Member agencies of the New Jersey Interagency Council on Climate Resilience have also committed to collaborate on the development of a science- and health-based framework for reducing worker exposure to high or extreme heat conditions and heat illness prevention (WS-1). This framework – which could help inform an occupational heat stress standard and heat-related illness and injury prevention plan developed through regulation - would be accompanied by a compendium of existing models, or examples of efforts undertaken by state departments and agencies to streamline worker safety guidelines, institute heat exposure reduction thresholds, develop and disseminate outreach, education and training to staff and managers, and highlighting the OSHA Heat National Emphasis Program (NEP, see inset box). Once developed, the framework and accompanying compendium would allow state agencies to customize elements to adopt within their own workplace contexts and deploy accordingly. NJDOH and NJDOL currently have regulatory jurisdiction under New Jersey's OSHA-approved State Plan to provide enforcement and targeted outreach to cover public sector employers. NJDOH and NJDOL are currently disseminating OSHA outreach

materials including a model heat illness prevention plan for public sector employers, and ask employers to complete a heat-illness prevention questionnaire. Federal OSHA has regulatory jurisdiction to cover these activities for private sector employers.

Under NJDOH's OSHA cooperative agreement, NJDOH develops and disseminates outreach materials for both public and private sector workers on heat-related illness prevention strategies and highlighting the OSHA Heat National Emphasis Program (NEP). In the current absence of a state or federal heat stress standard to address heat in the workplace, under the current OSHA HEAT-NEP, citations issued by state officials must first be reviewed and approved by OSHA federal officials.

### Protect Agricultural Workforce

Lastly, New Jerseyans share a widespread concern regarding extreme heat exposure faced by workers in the agricultural sector. There are two efforts in the state that are working to address this need.

Proposed heat stress legislation (WS-3) would establish an occupational heat stress standard and heat-related illness and injury prevention program, including one





## PRIORITY 1: BUILD RESILIENT AND HEALTHY COMMUNITIES

that meets the particular needs of agricultural workers. The standards would set a threshold for extreme heat conditions that triggers specific protections for workers in those conditions, such as paid rest breaks, cold water, and access to climate-controlled or shady spaces. We must ensure that our regulations meet the needs of farm workers while simultaneously assuaging the needs and concerns of farm operators.

Second, an interagency effort between the New Jersey Departments of Agriculture, Labor and Workforce Development, and Health (NJDA, NJDOL and NJDOH) will review existing regulations and identify existing policies that establish protective standards for outdoor workers under extreme heat, and how they could be improved with a particular focus on agricultural sector (WS-4). This has been an ongoing item the NJDA continues to address as heat exhaustion has a major impact on the safety and health of agricultural laborers. The NJDA strives to ensure farm owners and workers are educated on the health symptoms of extreme heat stress and have strategies in place to mitigate adverse impacts. NJDOH has developed and will disseminate a fact sheet educating rural farm workers about actions they can take and what actions their employers need to take to protect them from heat-related illness.



*Cranberry Bogs in South Jersey*



## Public Health (PH)





Extreme heat exposure is a direct threat to human health that can lead to serious heat-related illnesses such as heat stroke and heat exhaustion and can also exacerbate underlying illnesses such as cardiovascular disease, diabetes, psychological distress, asthma, and acute and chronic kidney disease. The physical stress of excessively high and prolonged temperatures strains the heart and kidneys, and can result in headaches, reduced cognition and sleep disruption, among other things. Unfortunately, these kinds of seemingly minor, temporary strains on physical well-being can add up to big public health impacts. Across the United States, the heat-related mortality estimates are inconsistent, and likely underestimated. Public health indicators related to extreme heat may be under-counts, since patient records of emergency room visits and inpatient hospitalizations may fail to note exposure to indoor or outdoor heat as a potential contributory risk factor. Heat exposure may also fail to be noted as a contributory cause of death on death certificates.




Considerably more deaths are attributable to extreme heat events than other weather-related hazard events, as illustrated in Figure 13.

There are numerous agency actions and programmatic efforts described throughout the Extreme Heat Resilience Action Plan with the aim of improving public health. In some cases, agency actions represent direct and in situ

### PH ACTIONS

<i>Number</i>	<i>Name</i>	<i>Status</i>
<b>PH-1</b>	Expand Participation in the New Jersey Air Quality Flag Program	
<b>PH-2</b>	Support Medium- and Heavy-Duty Vehicle Electrification	
<b>PH-3</b>	Characterize Risk of Increased Pathogens, Shellfish Harvesting and Recreational Water Conditions	
<b>PH-4</b>	Encourage Individual and Community Resilience	

#### Action Key:

 Recommended    Ongoing/Underway    Completed

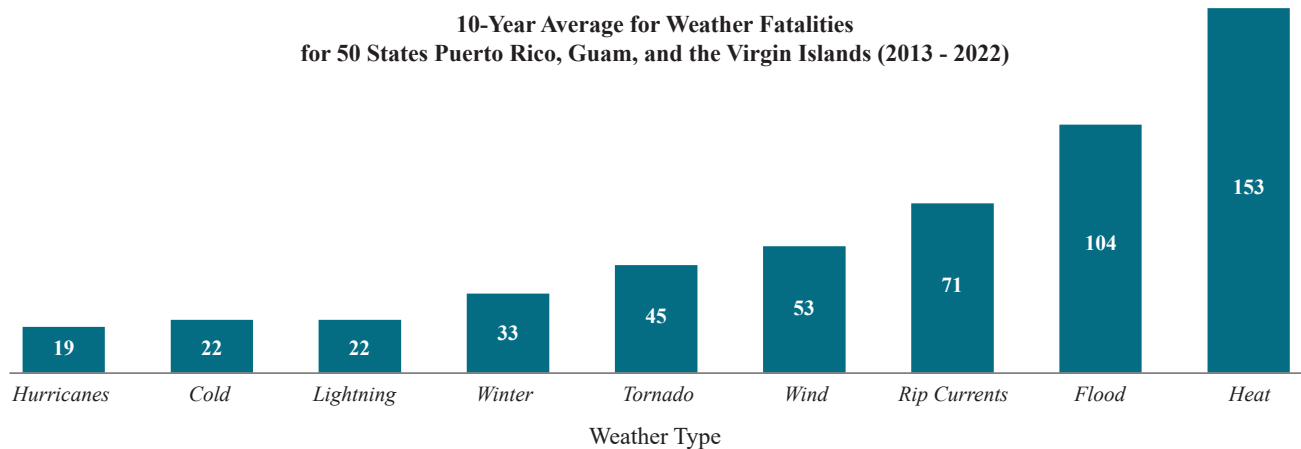




## PRIORITY 1: BUILD RESILIENT AND HEALTHY COMMUNITIES

Figure 13. 10-Year Average for Weather Fatalities (2013-2022). Source: [National Weather Service](#)

Note: Fatalities found under “Hurricane” events are only attributed to the wind. Other fatalities associated with hurricanes (i.e. fatalities from flooding and tornados during hurricane events) are attributed here within their respective weather category (i.e. Tornado, Flooding).



interventions, such as increasing shade. In other cases, the commitments of New Jersey state departments and agencies seek to mitigate or otherwise lessen the problems caused by extreme heat by, for example, preparing action plans or building broader awareness of heat health risks or promoting incentives designed to help nudge individuals and families to act.

The actions listed below recognize the ways in which heat worsens air pollution and water-borne pathogens, as well as existing individual and community vulnerabilities which can be addressed in part through state agency intervention.

### Address Air Quality Concerns

As warming trends continue, air quality conditions are expected to worsen, particularly in the warmer summer months when New Jerseyans are more likely to be spending time outdoors. During the summer months, sunlight interacts with certain pollutants, like nitrogen oxides, creating smog and poor air quality conditions, and exposure to unhealthy air is increased. To address this, the Department of Environmental Protection (DEP) will increase and expand its Air Quality Flag Program (PH-1). This program communicates air quality conditions using brightly colored flags that correspond to the USEPA’s Air Quality Index to help the public understand air quality forecasts. Meanwhile, DEP, the Economic Development Authority, and the Board of Public Utility will continue efforts to electrify medium-and heavy-duty vehicles to lessen tailpipe emissions, decreasing pollutants that create poor air quality conditions that are especially concerning in communities near heavy traffic corridors (PH-2).

### Monitor Impacts to Waterbodies and Shellfish

In considering the impact of warming trends on waterbodies, DEP’s ongoing monitoring of water quality conditions limits public health impacts from pathogen growth. DEP administers the Cooperative Coastal Monitoring Program with local health authorities to monitor coastal recreational beach water quality from mid-May through September to inform beach actions (advisories and closures). Similarly, the DEP classifies shellfish growing waters and determines whether and how the harvest of shellfish from those waters must be restricted to protect the public from health risks associated with the consumption of shellfish (PH-3).

### Build Resilience Through Infrastructure Planning

The Department of Health (DOH) will encourage individual and community-level resilience in keeping with action plans from DOH’s ten-year health planning framework, Healthy New Jersey 2030 (PH-4). To support resilience at the individual, community, and system levels, decision-makers and stakeholders must work to ensure adequate community-based public health infrastructure and a streamlined, transparent process for providing a range of emergency resources, information, and services that encompass the identified needs of community members, particularly supporting those who face historical, persistent, or increased marginalization.



## Energy Infrastructure (EI)



Energy systems play a foundational role in maintaining and improving the quality of life in New Jersey. From providing power to small businesses that drive our economy, to ensuring residents can turn the lights on at their homes, the need for modern and resilient energy infrastructure has never been more important as we transition our energy systems to clean energy. Without strong and responsive energy infrastructure in place, the threats posed by climate change can lead to dramatic impacts on our quality of life. Extreme weather events, notably extreme heat and cold, impose additional stresses on our energy systems due to increased demand for electricity for cooling and heating. Furthermore, the physical toll from the worsening temperature extremes increases the likelihood of mechanical issues, increasing the risk of service disruptions and blackouts.

Studies forecast New Jersey to be one of the more vulnerable states to rising temperatures, and therefore, the need for a modern and resilient energy system is critical to protecting residents, especially those in low-income and overburdened communities. New Jersey's overburdened communities are especially susceptible to the impacts of

### EI ACTIONS

<i>Number</i>	<i>Name</i>	<i>Status</i>
<b>EI-1</b>	Update Energy Demand Forecasts	
<b>EI-2</b>	Assess Grid Reliability in Extreme Heat Events	
<b>EI-3</b>	Implement a New Jersey Storage Incentive Program	
<b>EI-4</b>	Mitigate the Use of Peaker Plants	

Action Key:



Recommended



Ongoing/Underway



Completed





## PRIORITY 1: BUILD RESILIENT AND HEALTHY COMMUNITIES

climate change, particularly urban heat island effect (for more information see Urban Heat Islands) which results in extreme heat “hotspots” due to the lack of green spaces. When creating a set of strategies to target the impacts of extreme heat, it is imperative that actions confront systemic inequities. State and local governments and community partners can help by identifying urgent needs and providing sufficient resources to address community concerns, as well as ensuring there is robust and modern energy infrastructure in place to withstand periods of temperature extremes, notably heat.

The actions listed under this section represent measures driven by the New Jersey Board of Public Utilities (BPU) to adapt current infrastructure to these worsening weather and temperature extremes, along with programs backed by research to effectively support communities by ensuring the resilient and reliable distribution of power.

### Managing Grid Reliability

Electricity use by consumers typically ramps up during times of extreme weather, which can result in an overload that can provide stress to the preexisting energy system and cause power outages. BPU is working to predict and assess the demand for electricity on the hottest and coldest days. Through collaboration with utilities, PJM, and other stakeholders, the BPU can ensure that both supply and demand for electricity is met (EI-1).

As the impacts of climate change are projected to get worse, the BPU will continue working with investor-owned electric utilities to assess the grid distribution system and combat against vulnerabilities to strengthen

electrical grids (EI-2). As of 2024, the four private utilities are Atlantic City Electric Company, Jersey Central Power & Light, Public Service Electricity & Gas and Rocklands Electric Company.

### Promoting Resilience in the Energy Transition

Additionally, BPU manages the newly developed New Jersey Storage Incentive Program, which will help modernize our energy infrastructure and play a key role in New Jersey’s transition to an equitable clean energy future. This comprehensive program promotes the state’s transition to renewable energy through use of batteries strategically deployed to help stabilize the electric grid system, especially during times when the sun does not shine or the wind does not blow, or when electricity demand is at its peak during extreme heat and cold. The program ensures that reliability needs are met, which is critical for residents that are predominantly exposed to the impacts of extreme heat (EI-3).

And finally, BPU strives to alleviate the air pollution impacts caused by “peaker plants” which operate during periods of peak energy demand, and especially during extreme heat events when residences throughout New Jersey increase their electricity usage to operate air conditioners (EI-4). Because peaker plants are often located near or within overburdened communities, and are among the most polluting and costly electricity generating units to operate, this action focuses on opportunities to mitigate the impacts of the facilities, and eventually transition them to clean energy alternatives.

*Linden, NJ*





## Drinking Water and Water Supply (DWWS)



High Point State Park

As documented by New Jersey's 2020 Scientific Report on Climate Change, climate change is expected to affect water quality and availability in various ways. Increasing temperature and changes in precipitation will affect both the quantity and timing of available water and have a significant influence on water quality. On the whole, New Jersey will continue to have adequate supplies of water.

New Jersey is committed to increasing its knowledge of climate change impacts on water supplies through continued monitoring, research, and modeling efforts. The Department of Environmental Protection (DEP) has developed a preliminary assessment of climate change impacts to New Jersey's water supplies in its 2024 Water Supply Plan update (released Q1 2024) and will continue to use an ongoing process to monitor, research, model, and subsequently implement and revise policy to ensure that a reliable water supply is maintained.

Water supplies are highly dependent on the seasonal and total amounts of precipitation and runoff (supporting

### DWWS ACTIONS

Number	Name	Status
<b>DWWS-1</b>	Analyze Evaporation and Water Uses Changes	
<b>DWWS-2</b>	Analyze Increased Irrigation Water Demands Due to Longer Growing Season	
<b>DWWS-3</b>	Analyze Peak Potable Water Changes Due to Increased Temperatures	
<b>DWWS-4</b>	Analyze Changes in Groundwater Recharge	
<b>DWWS-5</b>	Continue Monitoring Flash Drought Conditions	
<b>DWWS-6</b>	Highlands Water Conservation Outreach Program	
<b>DWWS-7</b>	Incorporate Extreme Heat Considerations into Area-Wide Optimization Program	

Action Key:



Recommended



Ongoing/Underway

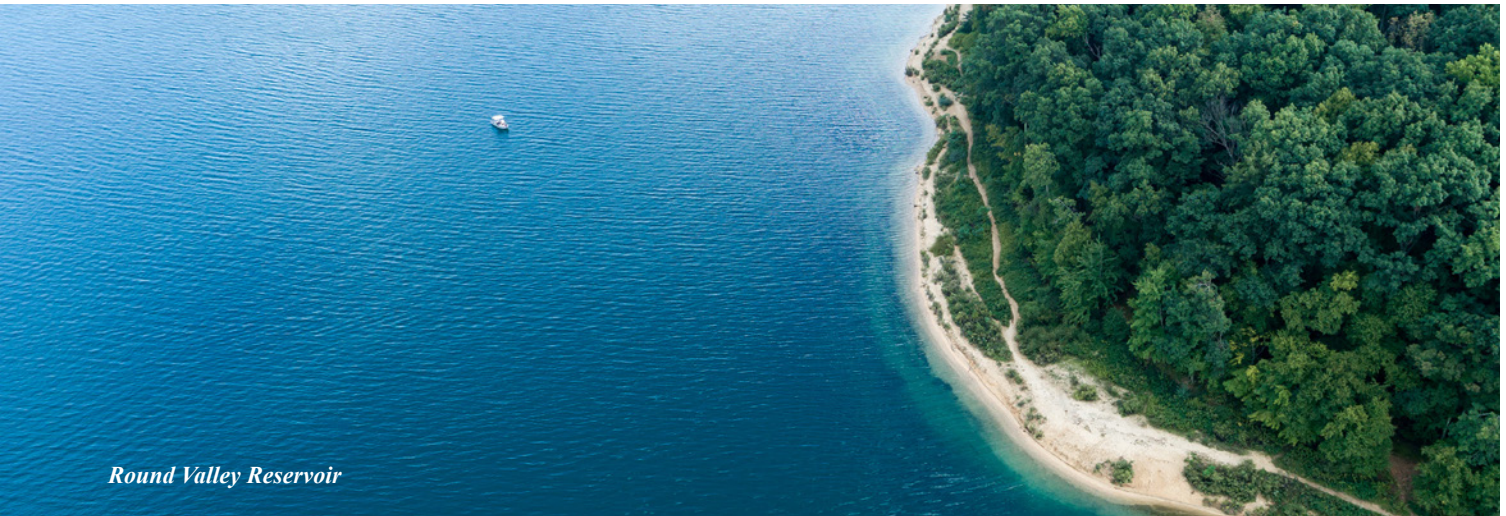


Completed





## PRIORITY 1: BUILD RESILIENT AND HEALTHY COMMUNITIES



*Round Valley Reservoir*

reservoir storage), groundwater recharge (supporting aquifer storage), and movement of groundwater into surface waters to support stream flows (supporting reservoir storage and aquatic ecosystems). Historically, precipitation has been relatively evenly distributed throughout the year and across the state, and these trends are expected to continue. However, extreme precipitation and tropical storm events (and in some regions sea-level rise) have already and will continue to negatively impact water supplies and its related infrastructure. While increased precipitation can increase water supply, especially for our larger reservoir systems, increased dry periods would stress supplies, especially for smaller reservoirs and shallow aquifers. These concerns are only expected to worsen in the coming decades.

Current research has also shown increasing temperatures in New Jersey, particularly in winter and faster than the global average (Shope et al. 2023). Increasing temperatures can impact water supplies in several ways including:

1. Shifting precipitation types (e.g., snowfall to rainfall),
2. Evapotranspiration rates (increasing movement of water from land or water surfaces and soils to the atmosphere through evaporation and plant transpiration),
3. Soil moisture deficits (changing irrigation needs), and
4. The intensity of storms.

Without appropriate planning — and adequate and strategically timed interventions — it is important to recognize that New Jersey may not have sufficient water

supply to meet its varied demands as periods of extreme heat and drought place additional stresses on water infrastructure and natural resources.

### Analyze Impacts to Drinking Water Supplies

The first set of agency commitments describes the DEP's increased efforts to analyze extreme heat impacts on the drinking water system and New Jersey's water supply. For example, DEP is working to gain a high-level understanding of how increased evapotranspiration and water usage are affecting New Jersey's water supply recognizing that despite increasing rainfall, rising temperatures tend to create higher water demand and cause more evaporation, increasing the likelihood of drier soil conditions (DWWS-1).

Extreme heat conditions create higher water demand in part because warmer temperatures in New Jersey's temperate climate result in longer growing seasons and increased demands for outdoor water uses, such as lawn and agricultural irrigation. Furthermore, if irrigation occurs during dry summer periods, increased water supply stresses may occur. To that end, DEP is working to determine the irrigation demands due to a longer growing season (DWWS-2). Similarly, DEP recognizes that understanding how peak water demand will change is critical to water supply planning. DEP is working to understand impacts to peak water demand and incorporate findings into the updated Water Supply Plan (DWWS-3).

These patterns may also transform as the relative changes in precipitation and temperatures shift. For example, it is possible that a longer growing season may reduce total





groundwater recharge since the water needs of plants may reduce groundwater infiltration beyond the root zone. On the other hand, total groundwater recharge may instead increase as New Jersey experiences more rainfall during milder winters. DEP will analyze changes in groundwater recharge, which is a critical factor in understanding stream flows both for the health of aquatic ecosystems as well as for reservoir storage (DWWS-4).

### Continue Monitoring Droughts

According to the “State of the Climate: New Jersey 2022” report summarizing the latest available scientific literature (Shope et al., 2023), the frequency and intensity of short-term, very dry to drought conditions are likely to increase. As more frequent dry periods during the growing season are interspersed by periods of heavy rainfall, the increased storm intensity can overwhelm soil capacity for infiltration, resulting in a greater percentage of precipitation going to runoff rather than aquifer recharge.

DEP is committed to continuing to monitor changes in the duration, magnitude and frequency of droughts (DWWS-5).

### Promote Education and Outreach

The two final strategies included in this focus area are interventions focused on broad-based education and safe drinking water delivery. The Highlands Council in partnership with DEP will advance a water conservation education campaign in its capacity as the regional authority overseeing drinking water protection for approximately 70% of New Jersey’s population (DWWS-6). Lastly, the DEP Area Wide Optimization Program (AWOP) can be leveraged to monitor extreme heat impacts on drinking water delivery, as the AWOP is designed to help water system operators intervene by increasing or modifying treatment needs at public drinking water systems upon detection of emerging trends (DWWS-7).

Merril Creek Reservoir

*“Without appropriate planning — and adequate and strategically timed interventions — it is important to recognize that New Jersey may not have sufficient water supply to meet its varied demands as periods of extreme heat and drought place additional stresses on water infrastructure and natural resources.”*







### Transportation (TR)

#### TR ACTIONS

Number	Name	Status
TR-1	Mitigate Extreme Heat Conditions While Performing Concrete Work	
TR-2	Implement Pavement Management Systems to Combat Extreme Heat	
TR-3	Research and Develop Heat Resilient Design and Construction Standards for Transportation Infrastructure	
TR-4	Analyze Extreme Heat Long-Term Infrastructure Exposure and Impacts	
TR-5	Integrate Extreme Heat Into the Resilience Planning	
TR-6	Update Authority Design Standards for Long-term Resilience	
TR-7	Implement a Cool Pavement Initiative at the Transportation Bank	
TR-8	Pilot Heat Sensors at Port Authority Sites	

Action Key:



Recommended



Ongoing/Underway



Completed



Every day, millions of residents and out-of-state visitors rely on New Jersey's roads, buses, trains, ferries, airports and other transportation facilities to move across the state and region. The state is home to the third-largest public transportation system in the country, providing approximately 260 million passenger trips each year on buses, trains, and light rail. The nearly 3,800 New Jerseyans who participated in the New Jersey Resilience Action Plan Extreme Heat Survey helped provide the Interagency Council on Climate Resilience with a good sense for the diversity of mobility approaches used on a daily basis. Nearly 68% of survey respondents are "extremely likely" or "likely" to use a personal vehicle; 7%, 6% and 4% (respectively) of those surveyed rely on ridesharing, buses, or trains. Many New Jerseyans also walk or use a bicycle or scooter on a daily basis (49% and 17%, respectively).

In addition to people, the state's interconnected transportation network moves freight throughout the region to fuel the national economy. With over 38,000 miles of roadway, more than 1,000 miles of railroad track, 19,000 bus stops, and thousands of other interconnected pieces of infrastructure, New Jersey's transportation system is vast, complex, critical, and vulnerable to the impacts of extreme heat.



Extreme heat events may cause disruption to the reliability of the transportation network, while compromising the health of those who depend on it. High temperatures can compromise the integrity of asphalt, concrete, steel, and other materials used in our transportation infrastructure. When agencies repair potholes, repave roads, build bridges, and lay railroad track, they design the infrastructure to withstand the temperature range that has been historically seen in the region. However, as the climate continues to change, New Jersey may face temperatures that the transportation infrastructure was not designed to withstand. Furthermore, those individuals who rely on transit and other mass transportation face potential health impacts from exposure to the heat as they wait for their buses and trains.

Several federal, state, regional, county, municipal, and private entities share responsibility to operate and maintain this unique infrastructure system. The New Jersey Department of Transportation (NJDOT), the New Jersey Turnpike Authority (NJTA), the Port Authority of New Jersey (PANYNJ), and NJ Transit are the largest transportation operators in the state, all of whom sit on the Interagency Council for Climate Resilience. While these organizations have unique responsibilities and operations, they work closely with one another, and other entities in the state, to deliver on a shared mission of providing safe and reliable transportation services to customers across the region. They also share a commitment to understanding the impact of climate change on transportation infrastructure

## TR ACTIONS (CONT.)

Number	Name	Status
TR-9	Climate Risk Assessment Initiative	
TR-10	Evaluate HVAC Design Standards for Long-Term Resilience	
TR-11	Update Port Authority Climate Resilience Design Guidelines	
TR-12	Incorporate Extreme Heat Initiatives and Guidance into NJ Transit Projects and Planning Documents	
TR-13	Improve Bus Shelter Design	

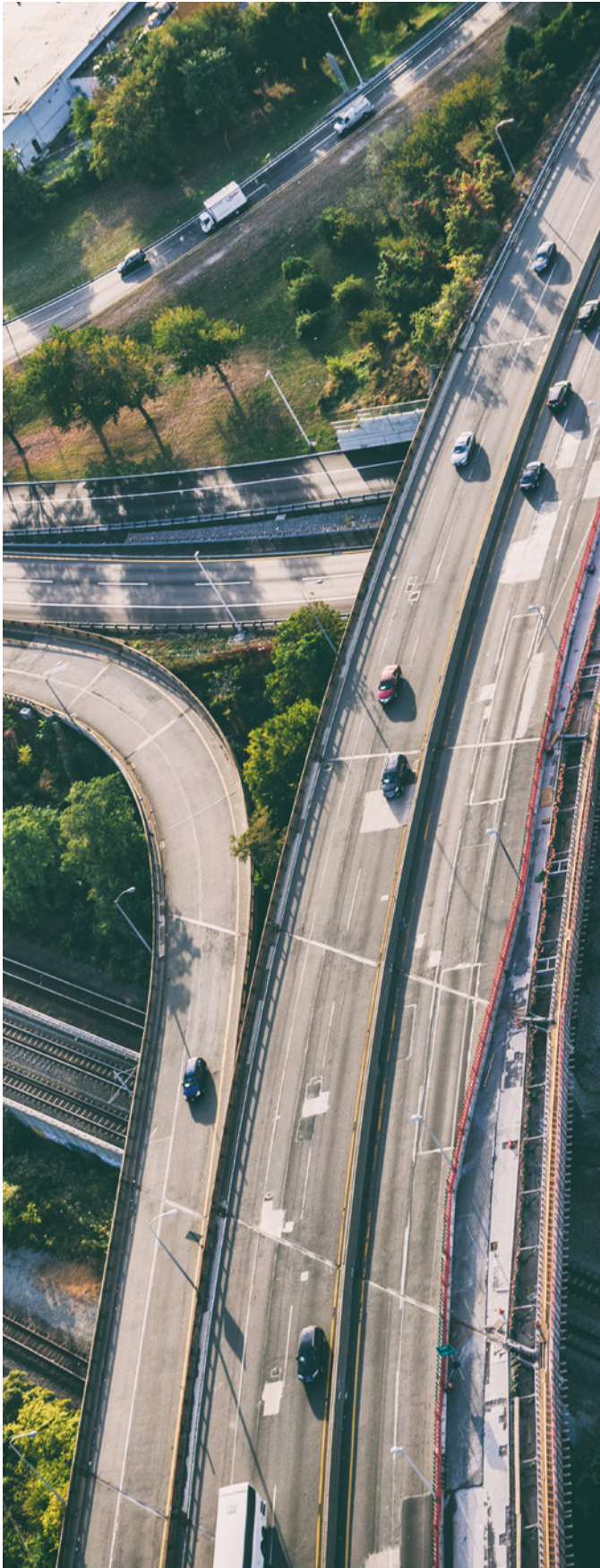
### Action Key:

Recommended Ongoing/Underway Completed

*“With over 38,000 miles of roadway, more than 1,000 miles of railroad track, 19,000 bus stops, and thousands of other interconnected pieces of infrastructure, New Jersey’s transportation system is vast, complex, critical, and vulnerable to the impacts of extreme heat.”*

Fort Lee, NJ





and customers. Each transportation agency has identified individual actions that collectively aid in understanding the impacts of extreme heat on surface transportation systems in New Jersey.

### Understand Impacts of Extreme Heat on Surface Transportation

Extreme heat can disrupt how concrete work is both conducted and cured. Even moderately high ambient temperatures can generate greater surface heat on concrete surfaces, affecting the ability for concrete to cure properly. When placing concrete, the NJDOT will continue to use methods to protect the concrete against heat conditions which can disrupt the way concrete work is conducted and cured impacting concrete strength and quality (TR-1).

For non-concrete assets, the NJDOT has initiated a study to incorporate risk and resilience into Pavement Management System (PMS) analyses, which is the program NJDOT uses to track and address deficiencies in pavement surfaces on state roadways. This study will gather information to aid in developing pavement designs with improved heat resilience (TR-2). Additionally, NJDOT will review best practices and internal practices for design and construction standards that mitigate extreme heat impacts on transportation infrastructure (such as for road materials or striping) and operations (TR-3).

To understand how extreme heat may impact the state's major highway routes, the NJTA will research the long-term impacts of extreme heat on the state's toll-road system infrastructure, including HVAC systems, pavement, and structure life cycle. Leveraging approaches and frameworks developed through the ongoing flood exposure assessment and vulnerability pilot effort, the NJTA will conduct an extreme heat exposure and vulnerability assessment of NJTA assets (TR-4).

### Modify Design Standards and Practices

The NJTA has identified extreme heat as a climate stressor in its current Resilience Plan, based on the 2020 New Jersey Scientific Report on Climate Change. The next update of the NJTA's Resilience Plan will include a progress update on extreme heat research and activities (TR-5). The NJTA will explore integrating extreme heat considerations into its Design and Procedures manuals (TR-6).





These activities by NJDOT and NJTA will impact state roads, but municipalities and counties are responsible for the majority of roadway miles across the state. The New Jersey Transportation Infrastructure Bank provides low interest loans for local transportation projects with a mission to reduce the cost of financing for critical county and municipal transportation projects. This fund seeks to incentivize projects that utilize reflective materials or can demonstrate the design minimizing heat retention (TR-7).

### Update Guidelines to Increase Operation Reliability and Customer Experience

Both PANYNJ and NJ Transit are considering activities to reduce the impact of extreme heat on their operations and on their customers. One of the challenges facing agencies in addressing extreme heat is understanding the microenvironments where extreme heat poses a threat to health or infrastructure. To address this data gap, the Port Authority is considering a pilot program to place heat sensors within Port Authority sites to explore localized extreme surface temperatures (TR-8). In addition, the Port Authority is conducting an extreme heat screening of critical assets as part of the ongoing, agencywide Climate Risk Assessment (CRA) with the goals of identifying cascading consequences and developing proposed

mitigation interventions (TR-9). PANYNJ is currently updating the HVAC section of the Mechanical Guidelines for all new conditioned spaces (e.g., buildings, other covered structures, equipment enclosures, etc.) built by the Port Authority (TR-10). Lastly, the agency will update Port Authority Climate Resilience Design Guidelines (v 2.0) to add extreme heat as a stressor category. These guidelines apply to the design of all new construction and major rehabilitation projects (TR-11).

NJ Transit will update existing project planning and guidance documents, including the Commuter Rail Stations Guidelines & Standards Manual, to incorporate best practices around extreme heat. Planning documents will encourage the use of climate-resilient design features and materials where feasible (TR-12). To improve the safety of bus riders, NJ Transit will design and develop a new bus shelter that improves protection against extreme heat. The shelter will accomplish this through design features such as incorporation of natural ventilation, specialized building materials, and solar powered lighting to reduce heat. Additionally, NJ Transit will investigate additional bus shelters in areas with limited protection from the sun (TR-13).

*Hoboken, NJ*


















## Municipal Capacity Building and Technical Assistance (MCB)

### MCB ACTIONS

Number	Name	Status
<b>MCB-1</b>	Develop Guidance for Climate Change-Related Hazard Vulnerability Assessments	
<b>MCB-2</b>	Develop Heat Intervention Toolkits for Built Environment	
<b>MCB-3</b>	Expand & Enhance Resilient NJ Program	
<b>MCB-4</b>	Regional Resilience Officer Pilot Program	
<b>MCB-5</b>	Launch Resiliency & Adaptation Plan Assistance Program (RAPP)	
<b>MCB-6</b>	Launch Just Resilience Initiative	
<b>MCB-7</b>	Fund Temporary Grant Writing Support Staff	
<b>MCB-8</b>	Provide Hazard Mitigation Technical Assistance to Communities	

*Action Key:*

 Recommended    Ongoing/Underway    Completed



Because the impacts of climate change are felt at the local level, municipalities must be equipped to effectively plan for and respond to these issues, including extreme heat. Local officials and employees need support from state level decision-makers to build and enhance their capacity to improve resilience and provide technical assistance when possible. To support the implementation of existing programs and policies at the municipal level, a multi-faceted approach is needed to develop new tools, templates, and guidance encouraging municipalities to act to protect their constituents against the impacts of increased temperatures.

Public Law 2021, Chapter 6 was signed into law by Governor Murphy in 2021 and amended the Municipal Land Use Law to require municipalities to update the land use element of their master plans to include a climate change-related vulnerability assessment (CCRHVA). This assessment calls for analysis of current and future climate change-related hazards, with increased temperatures explicitly identified. With this law in place, there is now regulatory structure to ensure towns assess their vulnerability not only as it stands now, but in future conditions as well.

The following suite of actions proposed by New Jersey departments and agencies provide strong guidance and



support to ensure responsible and forward-looking planning, and describe state agency efforts to directly assist local governments. Ensuring that municipal governments are effectively supported in turn helps the State to protect its communities and residents from extreme heat today and in preparation for a warmer future.

## Develop Municipal Guidance

The New Jersey Department of Environmental Protection (DEP) is developing and promoting heat-related guidance and tools that can help municipalities to better understand their vulnerabilities to extreme heat and urban heat island impacts (MCB-1). Written in collaboration with key partners, the guidance and tools will support local officials to develop and implement measurable strategies to mitigate their vulnerabilities and help municipalities complete a CCRHVA that satisfies the requirements of the Municipal Land Use Law.

DEP guidance and tools may also be of value to municipalities pursuing Plan Endorsement through the State Planning Commission, a voluntary review process designed to ensure the coordination of State and local planning efforts in achieving the goals and policies of the State Planning Act. As the primary agency staff supporting the work of the State Planning Commission, the Department of State's Office of Planning Advisory is a key partner working to incorporate extreme heat resilience actions to the Plan and Implementation Agreement confirmed by local governments seeking [Plan Endorsement](#).

Many interventions to increase resilience to extreme heat focus on the built environment, including green buildings, urban forestry, and increased community greening. DEP will work to develop a compilation of standard heat interventions for different types of neighborhoods, such as highly urbanized/dense city setting, small historic downtown, mid-century suburban community, rural area, or corridor of commercial or industrial facilities located in close proximity to a key transportation asset (MCB-2). Where appropriate, these interventions could be incorporated into the [Resilient NJ: Local Climate Resilience Toolkit](#) and serve as a reference guide for assessing options, costs, and co-benefits in cases where specific interventions address other climate-related risks (i.e., stormwater flooding). This effort can leverage the know-how of a variety of New Jersey specific studies, plans, programs, researchers and key local experts.

## MCB ACTIONS (CONT.)

Number	Name	Status
<b>MCB-9</b>	Continue the Resilient Communities Program	
<b>MCB-10</b>	Develop Green and Sustainable Remediation Guidance for Licensed Site Remediation Professionals	

*Action Key:*

 Recommended    Ongoing/Underway    Completed

*Figure 14: DEP's Resilient NJ: Local Climate Resilience Toolkit*

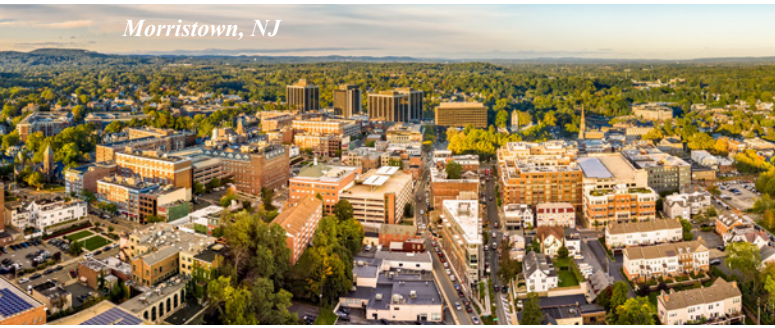






## PRIORITY 1: BUILD RESILIENT AND HEALTHY COMMUNITIES

*Morristown, NJ*



As New Jersey's flagship program for municipal resilience planning support, the [Resilient NJ program](#) offers both bespoke technical assistance programs and widespread written guidance and training materials to help local and regional leaders effectively plan for and implement local resilience projects and initiatives. Using the best available science on precipitation, temperature, and sea-level rise, Resilient NJ helps communities plan for how the changing climate may affect residents, businesses, and the natural and built environments throughout New Jersey. DEP is committed to expanding and enhancing the Resilient NJ program into a comprehensive climate resilience program for local governments, including planning for extreme heat (MCB-3). The program provides technical assistance to help communities and regions develop resilience action plans and prepare CCRHVAs which must consider and result in strategies to address extreme heat.

### Provide Direct Technical Assistance for Local Resilience Planning

The DEP will seek funding to develop a Regional Resilience Officer and Resilience Expert Mentorship pilot program which would work under the umbrella of the Resilient NJ program (MCB-4). This pilot program would fund staff with resilience expertise to work directly within a local government entity as a regional resilience officer. This individual will act as the point person readily available to provide resilience-related guidance, assistance, and leadership, and support decision-making and coordination.

The Resilience Expert Mentorship Services (REMS) would provide an easy pathway for local government or county officials, neighborhood groups, facilities managers, and others to temporarily request and secure direct support from a dedicated cadre of subject matter experts in various disciplines related to community resilience. Examples of expertise that could be available on-demand include urban foresters contracted to

complete an assessment of appropriate tree planting and maintenance opportunities within urban heat islands, or adaptation practitioners with deep knowledge of cool roof or cool pavement deployment. A REMS program can be thought of as a unique approach to having resilience experts “on retainer” to quickly and efficiently deploy supportive services to “unstick” pressing extreme heat concerns identified by local leaders.

Additionally, the Department of Community Affairs is developing an additional technical assistance program that will provide planning and technical assistance services that specifically address climate adaptation and resiliency in municipalities that have prepared a CCRHVA. The pilot program, also known as the Resiliency & Adaptation Planning Program (RAPP), offers a suite of municipal plans and land development ordinances that specifically address climate adaptation and resilience (MCB-5).

Finally, in a partnership with Rutgers University-Newark's Clement Price Institute on Ethnicity, Culture & the Modern Experience, the Department of Environmental Protection has been awarded an Energy Futures Grant from the U.S. Department of Energy to create a new program entitled “Just Resilience”. The project scope is designed to accelerate beneficial resilience commitments in communities spanning the Greater Passaic River Watershed with an initial focus on community preparedness to combat and mitigate extreme heat. Working with a network of governmental and non-government leaders alongside energy equity and community resilience subject matter experts, the project will help identify existing community facilities which could be used to house Community Resilience Hubs. Fully deployed, these community resilience hubs would serve as a distributed network of education, capacity building and training, demonstration and emergency response centers to help communities throughout the region build resilience to extreme heat (MCB-6).

### Provide Support for Municipalities to Seek Funding

The next three actions both acknowledge the challenges municipalities face in seeking out, applying for and securing, resilience project funds. While there may be influxes of federal funds available, too often, capacity limitations hinder their ability to undertake new actions and efforts or apply for and manage grants. New Jersey's disadvantaged and distressed municipalities are especially



challenged in that they often have far less capacity to seek and apply for that funding when compared to more affluent communities. Funding the provision of temporary staff at the NJDEP would provide direct support to overburdened communities to help them identify and apply for federal funding to address their extreme heat and other climate resilience needs (MCB-7).

The New Jersey Office of Emergency Management is likewise eager to support communities requesting support from FEMA's Hazard Mitigation Assistance (HMA) program. OEM has developed a specialized program to prioritize support and capacity-building in underserved communities (MCB-8). One specific example is NJ OEM's work with the New Jersey Institute of Technology (NJIT) to serve as a technical assistance partner, leveraging NJIT's academic and research capabilities to support state and local government efforts in building resilience against natural disasters, with a particular focus on socially vulnerable and overburdened communities. NJIT will engage in capacity building initiatives, focusing on educating and supporting communities to develop application narratives and forms, accessing FEMA grant funds, and enhancing project development. Through these efforts, OEM aims to empower these communities with the knowledge and resources needed for sustainable development and disaster mitigation.

Lastly, the Department of Community Affairs recognized the considerable opportunity available from federal sources to implement resilience projects that are broader in scope. To that end, the post-Ida Resilient Communities Program was designed to mirror the federal Building Resilience Infrastructure & Communities grant program administered by the Federal Emergency Management

Agency (FEMA) in order to help municipalities accelerate opportunities to pursue federal funding by leveraging the application materials prepared for DCA's Resilient Communities Program submission requirements. The Resilient Communities program (application period now closed) was a competitive grant program focused on advancing community resilience to future natural disasters and climate hazards. Applicants were encouraged to consider the widest possible range of potential hazards to their community, including vulnerability to extreme heat events (MCB-9).

### Develop Guidance for Licensed Site Remediation Professionals

The DEP Contaminated Site Remediation & Redevelopment (CSRR) Program's Administrative Guidance for Green, Sustainable, and Resilient Remediation encourages consideration of extreme heat resilience in site remediation activities. It is estimated that there are nearly 15,000 contaminated sites across the state of New Jersey, 11,205 of these which are active cases managed under the DEP Licensed Site Remediation Professional (LSRP) program. LSRPs follow DEP rules and guidance during the remediation process. As such, this guidance encouraging heat resilience and cooling strategies (including the creation of green spaces) is a helpful and needed intervention to ensure the agency includes opportunities for extreme heat mitigation at remediation sites. Extreme heat resilience is one of seven strategies specifically called out in the CSRR guidance document, which encourages the use of cooling strategies such as green open spaces, green infrastructure, and tree canopy development particularly in urban brownfield redevelopment projects (MCB-10).







## Regional Planning (RP)

### RP ACTIONS

Number	Name	Status
<b>RP-1</b>	Continue Restoration of Meadowlands Habitats and Open Spaces	
<b>RP-2</b>	Incorporate Extreme Heat Risk and Opportunities into Agency Strategic Plans	
<b>RP-3</b>	Updating NJSEA's Master Plans and Guidelines to Incentivize Resilient Practices	
<b>RP-4</b>	Incorporate Extreme Heat into the Highlands Regional Master Plan Update	
<b>RP-5</b>	Update to Highlands Land Use Ordinance	
<b>RP-6</b>	Incorporate Evaluation of Extreme Heat Prevention and Mitigation Strategies for Local Governments	
<b>RP-7</b>	Highlands Region Community Forestry Management Planning	

Action Key:



Recommended



Ongoing/Underway



Completed



New Jersey Meadowlands

New Jersey is a home-rule state, providing municipalities with the authority to make development and land-use decisions. However, in recognition that there are resources in the state that require additional protection and oversight, the legislature created the Meadowlands Commission (1969), the Pinelands Commission (1979), and the Highlands Council (2004) to oversee development and preservation in three unique regions. In 2015, the New Jersey Sports & Exposition Authority (NJSEA) absorbed the Meadowlands Commission, and its responsibilities for planning and development in the Hackensack Meadowlands District. The location of the regions is depicted in Figure 4.

Each of these organizations plays a dual role of managing the natural resources within the region, as well as influencing local decisions as they relate to land use, development, and natural resource conservation activities.

Through regional master plans and other strategic plans, each regional planning organization identifies priorities



and strategies to preserve the natural and cultural resources within their region. As extreme heat increases the potential threat to water resources, green and natural areas, these regional planning organizations will work to mitigate the impact to the resource within their purview and support municipalities to make choices that minimize the exacerbation of extreme heat.



## Heat Resilience Efforts in the Meadowlands

Specifically, NJSEA works to protect existing and increase canopy and vegetation cover on state-owned properties throughout the Hackensack Meadowlands District. This ongoing effort is critical to mitigate the impacts of extreme heat on the region (RP-1). NJSEA will incorporate extreme heat risk and mitigation opportunities into agency strategic plans, identifying co-benefits related to reduced energy use, improved public health, and reduced stormwater runoff where possible. NJSEA will incorporate this into the next update of the Meadowlands Master Plan, as well as department strategic plans (RP-2). In addition to incorporating information about extreme heat risks and mitigative practices on state lands, NJSEA will incentivize private developers to undertake practices that help reduce the effects of climate change and extreme heat through the master plan, zoning regulations and landscape and open space guidelines (RP-3).

## Planning for Water Protection in the Highlands

In the Highlands Region, the Highlands Council recognizes that water resources may become more stressed as extreme heat events drive increased demand and a greater loss of water back into the atmosphere through evaporation and transpiration. To address this need, the Council plans several initiatives to reduce the impact of increased temperature on the state's critical water resources. Foremost, the Council will update the Highlands Regional Master Plan to include goals and actions associated with the prevention, and where necessary, mitigation of impacts related to extreme heat (RP-4). Land use ordinances and project review standards are the main implementation mechanisms for the Regional Master Plan. The Council will incorporate changes to the Highlands Land Use Ordinance and Highlands Project Review Standards to encourage, and where appropriate, require the adoption of cooling strategies, including but not limited to options such as use of cool pavement coatings on impervious surfaces and roofs, and increased tree canopy coverage in

## RP ACTIONS (CONT.)

Number	Name	Status
<b>RP-8</b>	Reduce and Disconnect Impervious Surfaces	 Ongoing/Underway
<b>RP-9</b>	Expand NJ Highlands Water Use and Conservation Management Program	 Ongoing/Underway
<b>RP-10</b>	Heat-Tolerant Native Pinelands Plant Species Guidebook	 Recommended

### Action Key:




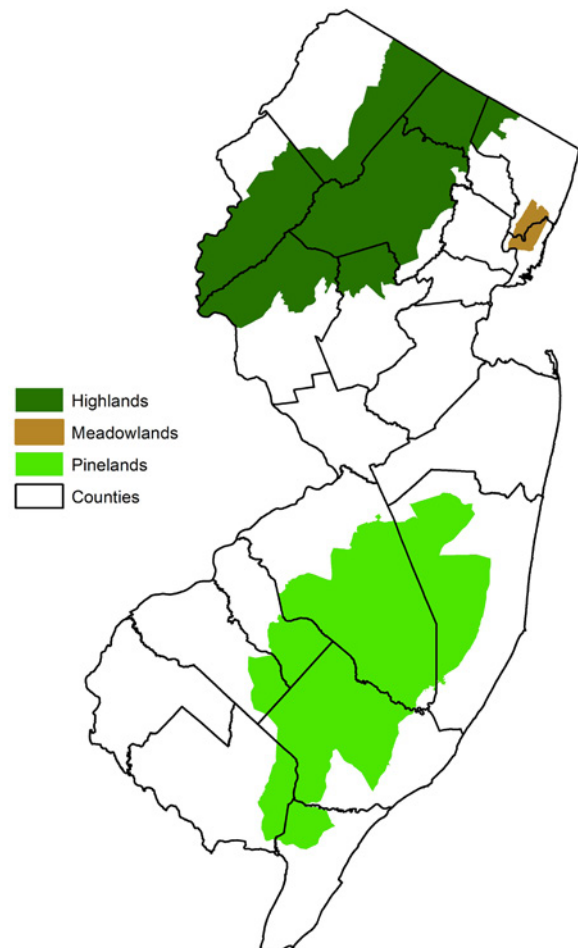
 Recommended     Ongoing/Underway     Completed

Figure 15. New Jersey Regional Planning Areas







new and existing developments (RP-5). The Council will incorporate the evaluation of extreme heat prevention and mitigation strategies in local assistance funding, which provides grants to municipalities and counties to evaluate extreme heat prevention and mitigation strategies (RP-6).

Additionally, the Council will encourage Highlands Region municipalities to implement Community Forestry Management Plans for the protection, enhancement, and safety of the local urban and community forest, as well as the ecosystem services associated with a well-managed tree resource (RP-7). Where appropriate, the Council will identify project areas to eliminate impervious surfaces, which can reduce the urban heat island effect and improve stormwater infiltration/groundwater recharge and water quality (RP-8).

Although the Highlands Region covers less than 15% of the State's land area, it provides drinking water to more than 300 municipalities, home to 70% of New Jersey's population. As temperatures increase, so does water consumption. Much of this water consumption is directed towards the State's urban centers, where extreme heat will have significant impacts, particularly in overburdened communities and on vulnerable populations. Infrastructure planning grants are available for municipalities to develop Water Use and Conservation Management Plans, but there remains a need for increased adoption and buy-in among municipalities outside of the Highlands region that are consumers of Highlands water (RP-9).



*New Jersey Pinelands*

### Integrating Heat into Standards in the Pinelands

The Pinelands Commission is charged with preserving, protecting and enhancing the natural and cultural resources of the Pinelands National Reserve, and encouraging compatible economic and other human activities consistent with that purpose. To accomplish its mission, the Commission implements a comprehensive plan that guides land use, development, and natural resource protection across the Pinelands Area of southern New Jersey. Included in the comprehensive plan is a vegetation management program that mandates the use of native Pinelands shrub and tree species for revegetation and landscaping purposes and recommends the use of grasses that are tolerant of droughty, nutrient poor conditions.

The Commission will identify native Pinelands plant species that are more heat-tolerant, and encourage or require their use in landscaping plans associated with new development. Further, the Commission will work with municipalities to incorporate tree and other plant lists in their tree and landscaping ordinances. Municipalities, applicants, and homeowners use the Commission's existing Native Pinelands Plant Species guidance document to review recommended silviculture practices for the Pinelands region. Pinelands Commission staff will conduct research and gather data to refine this existing guidance document, and potentially inform future rulemaking efforts. Through this initiative the Pinelands Commission will evaluate its existing requirements and recommendations for the use of native plant species in landscaping plans and refine them to reflect and implement climate resilience objectives throughout this ecologically unique region of the state (RP-10).

use the Commission's existing Native Pinelands Plant Species guidance document to review recommended silviculture practices for the Pinelands region. The Pinelands Commission staff will conduct research and gather data to refine this existing guidance document, and potentially inform future rulemaking efforts. Through this initiative the Pinelands Commission will evaluate its existing requirements and recommendations for the use of native plant species in landscaping plans and refine them to reflect and implement climate resilience objectives throughout this ecologically unique region of the state (RP-10).



## Urban Heat Islands (UHI)



Palisades Park, NJ

Urban heat islands (UHIs) occur in cities and urbanized areas where ambient air temperature observations are considerably higher than the surrounding areas. The built environment — such as buildings and roads — absorb and re-emit the sun’s heat, resulting in “islands” of higher temperatures when compared to the relative cool of greener and more vegetated land uses commonly found in suburbs and rural areas outside of the metropolitan hubs of New Jersey. In such a densely populated state, residents in small and large cities (as well as some of the more built-up and developed suburbs) face increased extreme heat exposure due to the associated heat island effect.

When the UHI effect is considered alongside the socioeconomic challenges and environmental justice considerations facing many low-income families and individuals living in New Jersey cities, the impacts of increasing temperatures pose a significant threat to community health and safety. As such, creating healthy, resilient, and cool neighborhoods in New Jersey’s cities must be a priority. Strategies such as green infrastructure, cool roofs, and urban forestry can help to mitigate the effects of UHIs and create more livable cities.

### UHI ACTIONS

Number	Name	Status
<b>UHI-1</b>	Urban Cooling Pilot Program	
<b>UHI-2</b>	Develop Heat Island Assessment and Action Strategy	
<b>UHI-3</b>	Inform the Public on Reducing Energy Use	
<b>UHI-4</b>	Minimize Urban Heat Island Effect in Major Infrastructure Projects	
<b>UHI-5</b>	Encourage Redevelopment of Brownfields Sites into Green Spaces	

#### Action Key:

Recommended    Ongoing/Underway    Completed





## PRIORITY 1: BUILD RESILIENT AND HEALTHY COMMUNITIES



Newark, NJ

Although all New Jersey residents are affected by climate change, the state's most vulnerable communities stand to bear a disproportionate burden of its adverse impacts. Some populations are considered at increased risk due to pre-existing factors like age, health conditions, or historic and systematic inequities. Lower-income, elderly, and minority households who may struggle to effectively cool their homes, whether due to affordability challenges or aged building stock, are also at increased risk. When these vulnerability factors are combined with increased exposure to extreme heat conditions exacerbated by the urban heat island effect, we recognize the urgency of addressing this crucial matter that stands in the way of New Jersey's efforts to advance equity and climate justice.

The following action commitments and collaborative initiatives describe efforts by agencies of the New Jersey Interagency Council on Climate Resilience to provide focused support to municipal officials, community-based organizations, and households vulnerable to excessive and dangerous heat due to UHI effect.

### Urban Cooling Pilot Program

There is a new interagency effort to establish an Urban Cooling Pilot Program which would leverage funding and technical expertise from a variety of state agency partners to accelerate on the ground implementation and testing

of UHI mitigation strategies in discrete locations across multiple municipalities (UHI-1). Such an Urban Cooling Pilot Program concept would be strategically developed to fund eligible entities in planning for and installing a range of urban cooling projects which could include cool pavements and cool roofs (made up of white or reflective surface treatments), urban street tree plantings, public water drinking fountains, and possibly even deployment of weatherization and low-or no-cost heat pumps to provide indoor cooling improvements at community centers or other important community assets. The program would need to be accompanied by a strategic evaluation program to ensure the immediate and long-term effectiveness of cooling responses installed in UHIs throughout New Jersey.

### Develop UHI and Air Quality Strategy

The approach and design of the newly-launched UHI and Air Quality project recognizes the pernicious relationship between excessive heat and poor air quality. Ground-level ozone, for instance, is formed when sunlight interacts with certain pollutants in the air. The Department of Environmental Protection (DEP) has recruited a short list of especially hard-hit municipalities and community-based partners to collaborate in an USEPA grant-funded program that will combine heat vulnerability assessment, local temperature and air quality measurement and





monitoring with site-specific, community-led cooling interventions (UHI-2). The project builds on findings from the 2021 NOAA National Integrated Heat Health Information System (NIHHIS) Urban Heat Island projects funded in Newark, Jersey City and Elizabeth to collect local temperature readings and develop a more nuanced picture of heat disparities within different neighborhoods. To summarize project team lessons learned, the Department will prepare a summary of impacts of disproportionate heat conditions in disadvantaged communities. In the lead up to the project launch, DEP has developed a statewide map that visualizes land surface temperature as compared to areas with high social vulnerability.

### Prioritize Programmatic Interventions

The final set of actions explain a few specific ways in which New Jersey state agencies are prioritizing programmatic interventions within communities affected by UHIs. The Board of Public Utilities works with utilities and non-profit community-based organizations to promote

and increase uptake of energy efficiency measures, weatherization retrofits, home energy bill assistance, and affordable electrified cooling solutions in heat-vulnerable communities (UHI-3).

There are efforts underway to incorporate extreme heat resilience into the criteria guidelines for assessing and implementing Rebuild By Design projects in communities. Projects located with areas impacted by UHI effect will be required to incorporate shading, vegetation and drinking water stations, where possible and locally appropriate depending on project site usage (UHI-4). Lastly, the DEP Division of Contaminated Site Remediation and Redevelopment will work to encourage the redevelopment of brownfields located in urban areas into green spaces that can help to combat the UHI effect by working with remediating parties to consider urban cooling strategies such as green and open spaces, green infrastructure, and expanded tree canopy (UHI-5).












## Urban Tree Canopy & Community Forestry (UTC)

### UTC ACTIONS

Number	Name	Status
<b>UTC-1</b>	Expand Urban & Community Forestry Program Support and Technical Assistance in Overburdened Communities	
<b>UTC-2</b>	Leverage Federal Funds to Provide Sub-Grants for Urban & Community Forestry Efforts in Overburdened Communities	
<b>UTC-3</b>	Update the Community Forestry Management Plan Guidelines	
<b>UTC-4</b>	Analyze New Jersey's Urban Canopy	
<b>UTC-5</b>	Promote Urban Canopy on Private Property	

Action Key:



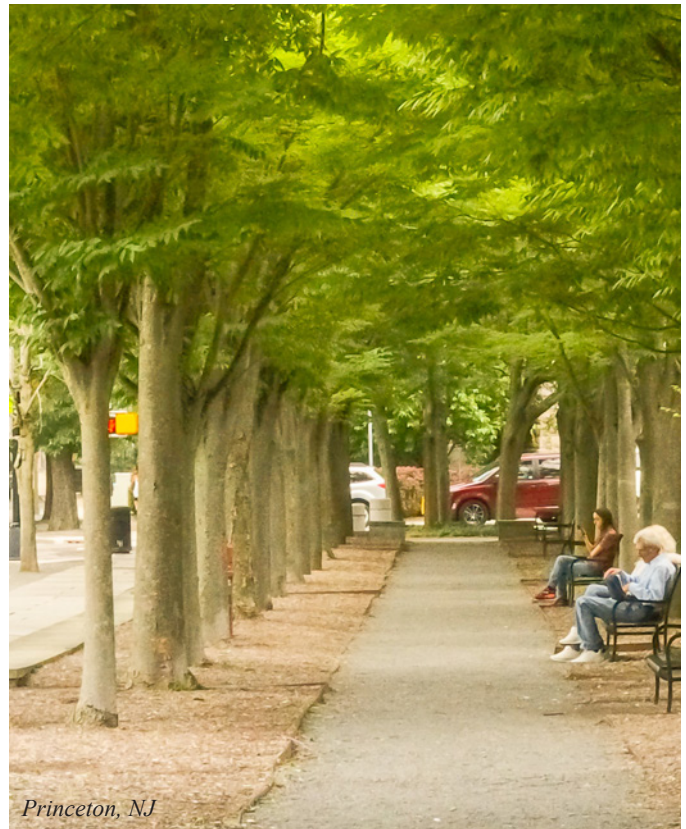
Recommended



Ongoing/Underway



Completed



Within the Department of Environmental Protection's (DEP) New Jersey Forest Service, the [Urban and Community Forestry \(UCF\) program](#) assists county and municipal governments in caring for and managing their urban canopy and community forestry assets through a variety of technical and financial assistance initiatives. The UCF program encourages, promotes, and assists in the establishment, retention, and enhancement of urban tree canopy and community forestry programs by local governments. Shade trees and community forests are a necessary and important part of New Jersey localities, and are critical to the environmental, social, and economic welfare of communities. Properly managed tree canopy provides a variety of ecosystem services including mitigating the heat island effect and heat resilience, community greening and beautification, reducing flooding from excessive stormwater runoff, and helping residents save on utility costs.



*“The UCF program encourages, promotes, and assists in the establishment, retention, and enhancement of urban tree canopy and community forestry programs by local governments.”*

## Expand the Urban and Community Forestry Program

In order to more effectively reach the communities hardest hit by the impacts of extreme heat in urban areas across the state, DEP is working to expand its reach as it strives to continually improve how the UCF program delivers assistance to counties, towns and cities (UTC-1). This effort will include a dedicated staff team focused on promoting UCF program participation, tree canopy equity, and extreme heat resilience, prioritizing its support to overburdened communities which often face shade tree deficits, increasing their vulnerability to extreme heat. To that end, the UCF program has applied for, and been awarded, \$11.25 million in Inflation Reduction Act funding to provide planning, inventory, maintenance, tree planting, and education in sub grants to overburdened communities in New Jersey. An important selection criterion for funding awards will be the degree to which municipalities are affected by the heat island effect and are lacking in tree canopy (UTC-2).

## Improve Guidance, Data, and Outreach on Community Forestry

In addition to this targeted, place-based work, counties and municipalities throughout New Jersey will benefit from improvements to community forestry guidance documents, statewide data, and outreach programs. In January 2024, the UCF program released an update to its guidelines for Community Forestry Management

Plans (CFMP). These recently updated CFMP guidelines, developed in partnership with the Rutgers University Urban Forestry Program, New Jersey Shade Tree Federation, New Jersey Tree Foundation, the Community Forestry Council, and others bring a renewed focus on heat islands, along with increased discussion of tree canopy concerns in overburdened communities, and an expanded scientific basis to inform local program management (UTC-3).

The UCF program has also worked with Rutgers University to develop an improved canopy assessment and is continually assessing improved methods to provide these data to local governments (UTC-4). Through the [NJ Forest Adapt](#) platform, community forestry program managers can access extensive information regarding climate-related and pest and disease risks to canopy, along with a variety of other statistics to help local officials better manage and protect community forestry assets.

Lastly, through its partnerships with the NJ Tree Foundation, NJ Shade Tree Federation, and PSE&G, the UCF program has also been advocating for management and understanding of urban forests on private property (UTC-5). Since tree canopy does not stop at the public right of way, it has long been understood that to maintain urban canopy, it is essential that local community forestry program managers engage and support of the homeowners, commercial areas and other property owners within a municipality.






### Recreation (REC)

#### REC ACTIONS

Number	Name	Status
<b>REC-1</b>	Modify Green Acres Funding Requirements to Prioritize Climate and Heat Impact Mitigation	
<b>REC-2</b>	Continue Implementation of the Local Recreation Improvement Grant Program	
<b>REC-3</b>	Incorporate Cool Design Strategies in Parks	
<b>REC-4</b>	Prevent Heat Illness During Equine Sporting Events	

##### Action Key:

 Recommended    Ongoing/Underway    Completed



*Hoboken, NJ Northwest Resiliency Pop-up Park*

For a small state, New Jersey packs a lot of opportunity for outdoor recreation at its numerous beaches, parks, lakes, and trails. Nearly one-third of the land in the state is preserved, much of which is managed for passive and active recreation. In a recent survey by the Department of Environmental Protection (DEP), over 83% of residents said outdoor recreation was personally important to them. This may be in part because research shows that outdoor recreation provides numerous mental and physical health benefits. Recreating in a natural environment helps relax the body, increases motivation, and leads to improved fitness and decreased risk for several diseases. Additionally, outdoor recreation can have positive impacts on mental wellness, including reducing anxiety, promoting connection, and reducing stress. However, extreme heat can make it difficult, uncomfortable, and even unsafe to recreate outdoors.

As the state continues to see increases in heat waves and extreme heat, the following actions describe how New Jersey state agencies are working to expand access to recreation and green space, improve outdoor recreation spaces, and help residents recreate safely.



### Prioritize Park Development in Urban Areas

The Green Acres Program, managed by the Department of Environmental Protection, was created in 1961 to meet New Jersey's growing recreation and conservation needs. Together with public and private partners, Green Acres has protected well over a million and a half acres of open space and provided hundreds of outdoor recreational facilities in communities around the state. Open space, in addition to the recreation benefit, can reduce the impact of extreme heat events in a community. The Green Acres Program recently revised its ranking system for local acquisition and park development funding to award additional points to projects that will meet the state's climate resilience goals. For acquisition projects, preserving urban open space and acquiring developed land in cities that will be restored to its natural state are major focuses for Green Acres. Park development projects in urban areas that include tree planting, removing impervious coverage, adding water features, or other measures that address the heat island effect will be given additional points (REC-1).

### Increase Cooling Features in Parks

In recognition that hotter days increase the demand for outdoor spaces with access for swimming or other cooling features and amenities like spray pads and water fountains, state agencies are working to add these amenities to both state and local parks. In New Jersey, residents rely on their local parks for recreation more than beaches, private recreation facilities, or state parks. To that end, the Local Recreation Improvement Grant, managed by the Department of Community Affairs, is a competitive program that supports improvement and repair of public recreation facilities including local parks, municipal recreation centers, and local stadiums. These grants cover costs associated with updating community centers, playgrounds, pools, fields, walking or bicycle trails, rail trails, multi-sport courts, and recreational facilities. The program specifically targets communities with limited or no access to outdoor or recreational space and creates an opportunity to increase access to cooling features in underserved communities across the state (REC-2). Providing funding for local park improvements,

*Updated every five years, New Jersey's "Outside, Together!" Statewide Comprehensive Outdoor Recreation Plan identifies statewide recreation needs and opportunities and sets forth a program to implement measures to address them. One of the six principles guiding the plan is enhancing climate resilience and sustainability through acquisition and recreational development.*

Stevens State Park





*Asbury Park, NJ*

especially those that provide shade and water features, will allow more residents access to safe recreation opportunities during heat events.

In addition to supporting local parks, New Jersey has a robust state parks and forestry system that covers approximately 425,000 acres. These lands are widely used, with 55% of residents reported visiting a state park, forest, or game lands in the past twelve months. As higher temperatures become more frequent, there has been an increase in demand for swimming access and cooling features. To meet this need, the Park Service is working to identify opportunities to provide more shade, access to swimming, and other cooling features. The Park Service is seeking opportunities to install refillable water stations, splash pads, interactive fountains, and misting stations. Additionally, shade structures are being added to existing playgrounds and parking lots to protect from exposure to the hot sun as well as add seating. These strategies are all designed to provide visitors with easy ways of cooling off and reducing the risks of heat-related illnesses (REC-3).

### Protect Health and Safety During Race Events

Lastly, another important role for the state is to protect the health and safety of those involved in state-sanctioned events. The New Jersey Racing Commission has recently adopted regulations that permit the Executive Director to order the postponement or cancellation of racing for any reason that poses a severe risk to the health, safety, and welfare of the equine and human race participants, including extreme weather conditions such as high heat and humidity (REC-4).



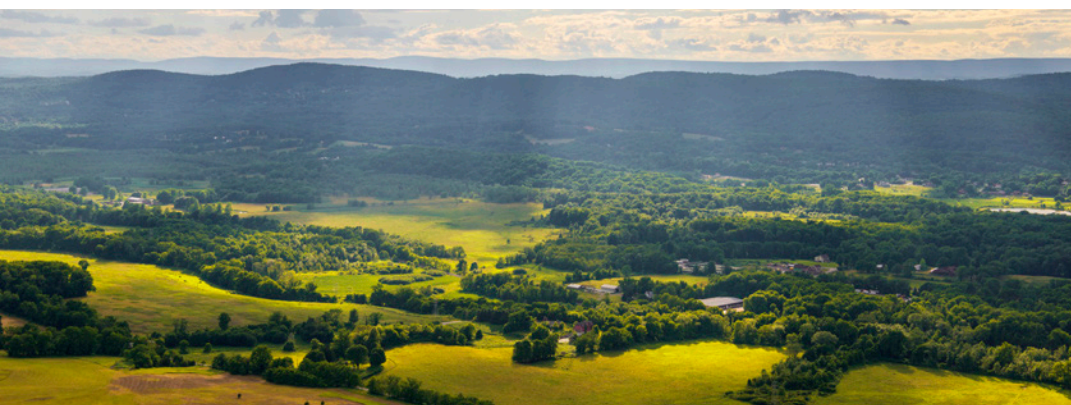


*“Nearly one-third of the land in the state is preserved, much of which is managed for passive and active recreation.”*





PRIORITY 2:  
**STRENGTHEN THE  
RESILIENCE OF NEW  
JERSEY'S ECOSYSTEMS**







As the second priority of the Climate Change Resilience Strategy dictates, *Strengthening the Resilience of New Jersey's Natural Ecosystems* is a primary goal for the state, particularly in the wake of a changing climate. In the case of extreme heat, maintaining the health of natural resources and improving their resilience is critical. Not only are our natural spaces themselves of concern, but the impacts that those ecosystems have on our communities, our personal health, and our economies are as well.

The benefits provided by ecosystem services cannot be overstated. Degradation to the health of those systems from extreme heat could lead to impacts on water quality, air quality, decreased biodiversity, and increased risk of wildfire. Actions herein seek to assess the health of natural systems and identify where they can be aided in conditions of extreme heat, for example, in the use of drought tolerant plants. The intrinsic value of biodiversity is important on its own, but it additionally plays a large role in the quality of life in New Jersey. Ensuring the state maintains its vibrant wildlife in extreme heat conditions is important for aquatic species like fish, particularly in a state where fishing is not only a popular recreational activity but a large economic contributor. The health of water bodies is also considered within this chapter, with actions under the Harmful Algal Bloom section addressing one of the greatest ecological concerns in the wake of increasing temperatures.

With the title of Garden State, it is well known that New Jersey encompasses significant fertile farmland. As such, agriculture is an important piece of the state's economy, yet highly vulnerable to climate change. Actions within this chapter by the New Jersey Department of Agriculture identify ways to bolster New Jersey's agricultural sector to withstand and adjust to impacts of extreme heat, including changes in growing seasons, preferred crops, and alternative growing methods. The health of New Jersey's ecosystems remains a priority for the state, and actions such as those in this chapter seek to improve and enhance their resilience.



*Black-crowned Night Heron in Barnegat Bay*

## 2023-2024 EXTREME HEAT SURVEY RESULTS

### Top Extreme Heat Concerns that Trigger other Threats/ Challenges Selected by Respondents:



Ecosystems/Wildlife



Crop Production



Air Quality



Wildfire



Drought



Drinking Water Quality

### Top Affects of Extreme Heat Selected by Respondents:



Cost (11.5%)



Discomfort (7.8%)



Environmental Conservation (7.5%)





## Agriculture (AG)

### AG ACTIONS

Number	Name	Status
<b>AG-1</b>	Promote Climate-Smart Practices	
<b>AG-2</b>	Provide Localized Assistance, Planning and Funding for Soil Conservation Districts	
<b>AG-3</b>	Revise and Relaunch the Conservation Cost Share Program Rules	
<b>AG-4</b>	Launch a State-Specific Commercial Crop Breeding Program	
<b>AG-5</b>	Communicate Practical Conservation for Livestock Producers within Watersheds and Riparian Corridors	
<b>AG-6</b>	Reduce Human Health Impacts Associated with Livestock Mortality	
<b>AG-7</b>	Utilize and Share the Rutgers Urban Agriculture Report	

Action Key:

Recommended Ongoing/Underway Completed



Aptly coined the Garden State, New Jersey is home to over 9,000 farms operating on approximately 800,000 acres. The contrasting geology and environment found throughout the state allows the production of many different types of commodity crops. Though a small state, the New Jersey landscape is exceedingly diverse, and features a vast array of fertile ground subdivided regionally by distinctive soil types, topography, hydrology, and climatic regimes. New Jersey has a rich agricultural history that has undergone many transitions.

New Jersey's agriculture industry sectors are routinely impacted by changes in weather patterns, including the various phenomena predicted to increasingly occur in New Jersey because of a warming climate.<sup>1</sup> These climate-related impacts include: a change in the length of the growing season;<sup>1,2</sup> delays in spring plantings due to wetter conditions in the early season; warmer and drier conditions mid-season; and an increased need for irrigation to sustain the health of crops, pastureland, and livestock.<sup>1</sup>

By its very nature, successful farming operations depend on a producer's ability to adapt. Growers are accustomed to unpredictable, and often unfavorable climatic conditions. They must consistently consider fluctuations in economics, changes in the cost of materials, labor,



equipment and collected returns on harvested crops and/or livestock. When faced with adverse growing conditions, farmers are proficient at adjusting or altogether modifying their management practices as needed to retain the viability of their operation.

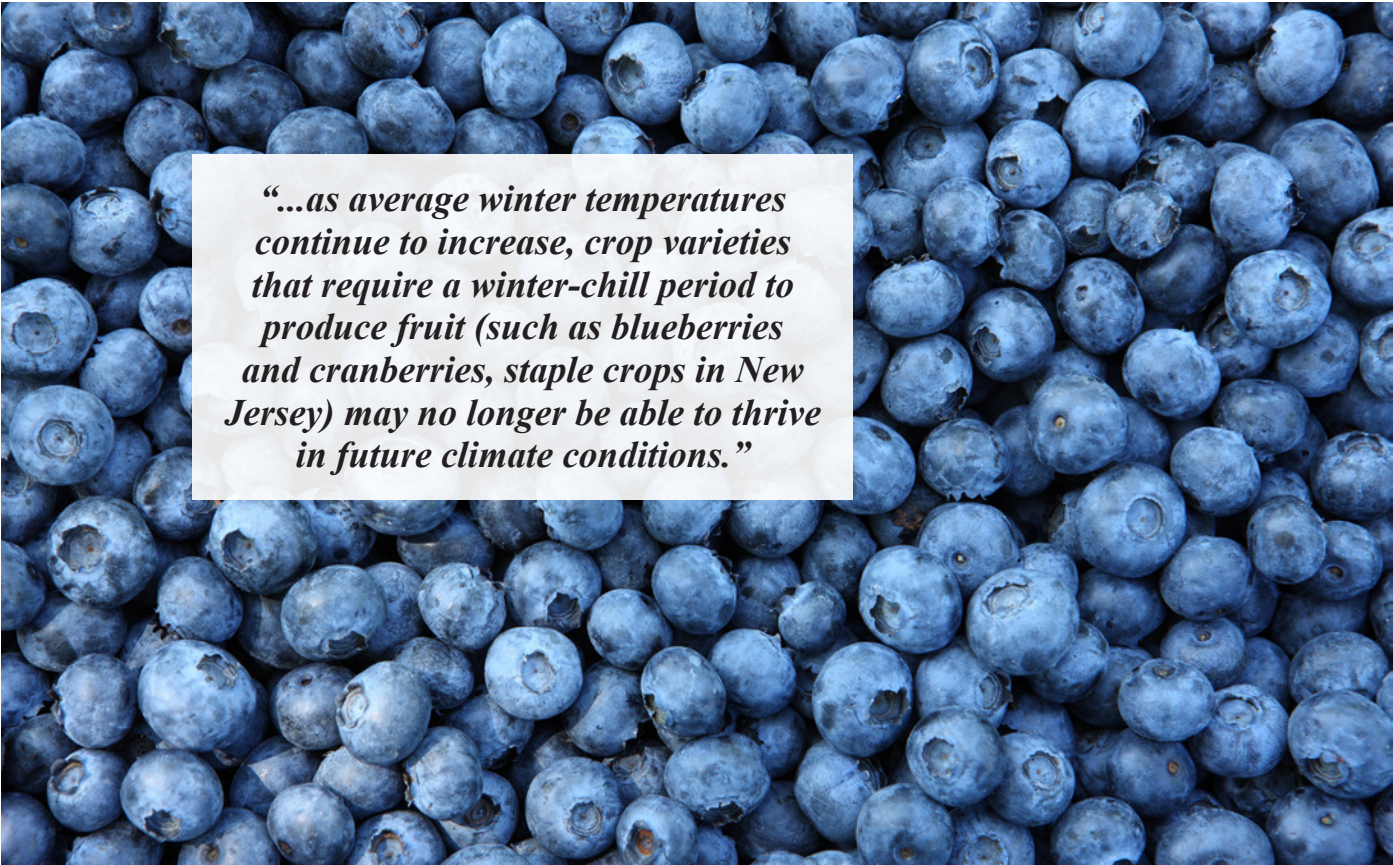
“Climate-Smart Agriculture,” coined by the United Nations Food and Agriculture Organization (FAO) in 2010, recognizes the unique challenge of climate change in the agriculture sector which is both a major global contributor of carbon and other planet-warming gases, as well as a victim of the adverse impacts of climate change.<sup>3</sup> Climate-Smart agricultural practices are guided by the three-fold goal of increasing sustainable production, helping farmers to adapt, and mitigating greenhouse gas emissions.

New Jersey state agency action commitments to build resilience to extreme heat in this focus area describe a variety of activities designed to support New Jersey’s agriculturalists through the provision of funding and technical assistance, targeted outreach and research collaborations, and context-specific programs and initiatives.

### **Provide Support for Resilient and Climate-Smart Practices**

The New Jersey Department of Agriculture (NJDA) will continue to collaborate with the United States Department of Agriculture (USDA) Natural Resource Conservation District (NRCS) and a variety of experts helping to advance the New Jersey Working Lands Strategy to encourage broader adoption of climate smart practices among New Jersey producers, with an emphasis on the consideration of agricultural practices that build resilience against extreme heat (AG-1).

These activities are further coupled with an effort to improve upon, and expand the reach of, and obtain funding for the NJDA’s [Conservation Cost Sharing Program](#) (CCSP) (AG-2). CCSP is an established but unfunded program within the NJDA. Funding for on-farm conservation practices is in high demand and federal funding availability provides the opportunity to reinvigorate this program which has been defunct due to lack of funding since the early 2000s. NJDA conservation cost share grants provide technical and financial assistance for farmers and landowners to develop best management practices for soil erosion and



*“...as average winter temperatures continue to increase, crop varieties that require a winter-chill period to produce fruit (such as blueberries and cranberries, staple crops in New Jersey) may no longer be able to thrive in future climate conditions.”*





*Cranberry Bogs, New Jersey Pine Barrens*

sediment control, animal waste nutrient management, water quality improvement, non-point source pollution control, and other natural resource management concerns. The revised program aims to provide supplemental funds to match USDA NRCS grant program incentives.

### **Launch a State-Specific Commercial Crop Breeding Program**

The NJDA and its research partners at Rutgers University and other land-grant institutions will invest in research to develop vulnerability assessments to identify which crops have been adversely affected by extreme heat as well as to seek out a better understanding of heat tolerant, drought tolerant, and climate resilient plant varieties (AG-3). Climate impacts pose a challenge to the types of crops, and cultivars (cultivated varieties) that can be grown in the state. For example, periods of prolonged high temperatures could allow insects and plant pathogens to produce more generations per season. Weed pressures could also increase, although collective knowledge on this subject is sparse. Similarly, as average winter temperatures continue to increase, crop varieties that require a winter-chill period to produce fruit (such

as blueberries and cranberries - staple crops in New Jersey) may no longer be able to thrive in future climate conditions.<sup>1</sup>

### **Managing Impacts of Extreme Heat on Livestock**

The next two actions address interventions focused on the impacts of extreme heat on livestock operations. The NJDA will develop outreach tools around climate-smart practices for livestock producers operating within riparian areas, the lands occurring along the edges of rivers, streams, and lakes (streambanks, riverbanks, and flood plains) (AG-4). Higher temperatures negatively impact livestock through a loss of productivity during the summer months<sup>1</sup> as dairy cows must work harder to stay cool when temperatures exceed 75°F. This causes less milk production, resulting in an estimated loss to the industry of \$3.3 million.<sup>3</sup> One climate-smart practice is the replanting and restoration of riparian vegetation which can provide shade to mitigate heat stress on livestock, while also filtering nutrients to limit pollutants from entering waterways and mitigating erosion.





Prolonged heat poses a risk to livestock wellbeing and can lead to increased mortality. To better prepare for this possibility, the NJDA Division of Animal Health will develop alternative methods of disposal of livestock and poultry carcasses during extreme heat events, a preemptive management strategy designed to protect the health of both livestock and humans (AG-5).

### Share the Rutgers Urban Agriculture Report

Lastly, the NJDA and Rutgers Office of Urban Extension and Engagement collaborated to develop the [NJ Urban Agriculture Portal](#), a web resource designed to share information, resources, and aid urban growers across New Jersey. The 2022 report entitled [Urban Agriculture Strategies for the State of New Jersey](#) addresses challenges facing urban growers including land access, food insecurity, and accessing technical assistance, and recommended interventions (AG-6).



*Chester, NJ*

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## Ecosystems and Habitat (ECO)

### ECO ACTIONS

Number	Name	Status
<b>ECO-1</b>	Promote Forest Restoration and Conservation in the Highlands	
<b>ECO-2</b>	Enhance Forest Resilience in Wildlife Management Areas	
<b>ECO-3</b>	Remove Dams Where Appropriate	
<b>ECO-4</b>	Protect Coldwater Riparian Habitats	
<b>ECO-5</b>	Assess Baseline Species and Climatological Records	

*Action Key:*



Recommended



Ongoing/Underway



Completed



During extreme heat events, New Jersey's forested areas, lakes, rivers, and streams provide natural respite to both human and animal communities. Even when temperatures are not peaking, vegetated lands capture rainwater and allow it to soak into the ground, replenishing streams and aquifers. Forests aid in extreme heat mitigation by sequestering greenhouse gases, acting as riparian buffers to cool surface waters, cooling by evapotranspiration, improving air quality, and having a higher reflective power (albedo) than developed/urban areas and impervious surfaces. Maintaining a healthy environment with thriving natural resources is a longstanding commitment for several state agencies and authorities. This commitment remains unwavering, but the necessary actions to manage ecosystems and habitat require additional or modified approaches. New Jersey's programs responsible for overseeing ecosystem and habitat vitality have identified five actions to ensure the state's forests, wetlands, streams, rivers, and other natural assets can adapt effectively to changing conditions.

Actions included in this focus area seek to proactively strengthen the natural systems across the state to withstand disruption from temperature shifts by protecting and restoring forests, removing impoundments from waterways, and preserving key riparian buffers across



*Round Valley Reservoir*

the state. This collection of best practices represents an ongoing commitment from state agencies to protect New Jersey's natural ecosystems and habitat for generations to come.

### **Protect and Enhance Forests**

The Highlands Council will continue to enhance its efforts to both restore and conserve forests in New Jersey's Highlands Region. The Highlands Region contains some of the most important forests in the state, performing an integral role in watershed health, sequestering greenhouse gases, and providing other ecosystem services that reduce heat (ECO-1).

Similarly, the NJ Fish & Wildlife program is looking to ensure forested lands in Wildlife Management Areas throughout the state can withstand periods of extreme heat. The next step in this goal is to better understand and allow for a transition to species that are better suited to withstand periods of extreme heat. While continuing to work to provide habitat for the existing assemblage of Species of Greatest Conservation, the DEP will, with increased staff capacity, launch a new initiative to consider policy changes that allow for species transition as the climate changes (ECO-2).

### **Maintain Surface Water Temperatures**

The next set of actions in this focus area concentrate on maintaining cool water temperatures in the state's

surface waters. Loss of riparian buffers leads to a loss of biodiversity and degradation of water quality. Surface waters are subject to increased flooding, pollution, and thermal spikes and the restoration and protection of riparian buffers is critical to maintain and enhance impacted waters, and reduce impacts caused by human impacts including climate change. The DEP is implementing multiple actions to advance this goal, including the removal of dams to improve water quality and reduce the warming that occurs in dammed surface waters, and restore natural flow regimes as funding is available (ECO-3). Additionally, NJ Fish & Wildlife is partnering with the Green Acres Program to focus land acquisition efforts along cold-water waterways, particularly those that significantly influence groundwater recharge, to mitigate the potential impacts of development along these key corridors (EH-4).

### **Track Species Shifts**

The final action describes a research effort to help the DEP better understand and track how climate change will impact species shifts, as well as northern shifts in pathogens and diseases that may impact flora and fauna. The DEP will assess vegetation records and wildlife population counts in the state, evaluating how extreme heat and drought-like conditions have driven and are likely to continue to drive species shifts in New Jersey and the Northeast (ECO-5).





## Harmful Algal Blooms (HAB)

### HAB ACTIONS

Number	Name	Status
<b>HAB-1</b>	Respond to the Impact of Harmful Algal Blooms on Recreation	
<b>HAB-2</b>	Protect Drinking Water Sources from HAB Impacts	
<b>HAB-3</b>	Empower Harmful Algal Bloom Research	
<b>HAB-4</b>	Implement the DEP Water Infrastructure Implementation Plan	

#### Action Key:



Recommended



Ongoing/Underway



Completed



Climate change has implications for water quality in all waters but especially in surface waters, where human land use patterns and temperature increases have the most direct effect on surface water chemistry. The increasing percentage of precipitation that comes during intense rainfall events will tend to increase stormwater flows, pollutant runoff from the land surface, erosion of stream beds (with associated release of sediment and soil phosphorus), and potential exposure of contaminated soils from parcels adjacent to riparian areas. As noted in New Jersey Department of Environmental Protection's (DEP) Scientific Report on Climate Change (2020), increased water temperature, nutrient loads, and total dissolved solids increase the potential for lower oxygen levels and an increase in cyanobacteria blooms, known simply as "harmful algal blooms" or HABs.

Cyanobacteria can discolor the waters and frequently impart off-tastes and odors to the water in which they grow. Some species can produce toxins (known as cyanotoxins) that can be harmful to the health of humans and animals. DEP defines a HAB as a density of identified cyanobacterial cells of 20,000 cells/ml or higher. HABs often occur under suitable environmental conditions of



high temperature, nutrient enrichment, and calm water. These blooms can result in a thick coating or mat on the surface of a waterbody, frequently in summer or fall, but blooms can occur year-round. Although problems related to cyanobacteria most often occur in freshwaters (lakes and streams), cyanobacteria can also be found in coastal waters.

While these water quality impacts will not likely reduce total water availability in New Jersey, they may result in more expensive and intensive needs for source water protection and drinking water treatment. This may cause temporary or permanent losses of supply if treatment is not feasible or takes time to install. HABs have already caused water supply concerns. In 2022, there were 65 documented occurrences in New Jersey, some of which were in surface waters upstream of major water supply intakes. As such, surface water quality and HAB monitoring is ongoing, and discussed in greater detail in the 2024 Water Supply Plan (draft released February 2024).

The actions under this focus area represent a range of state agency-led activities which aim to protect the public health during recreational activities, keep public drinking water safe and communicate risk, prevention and mitigation measures.

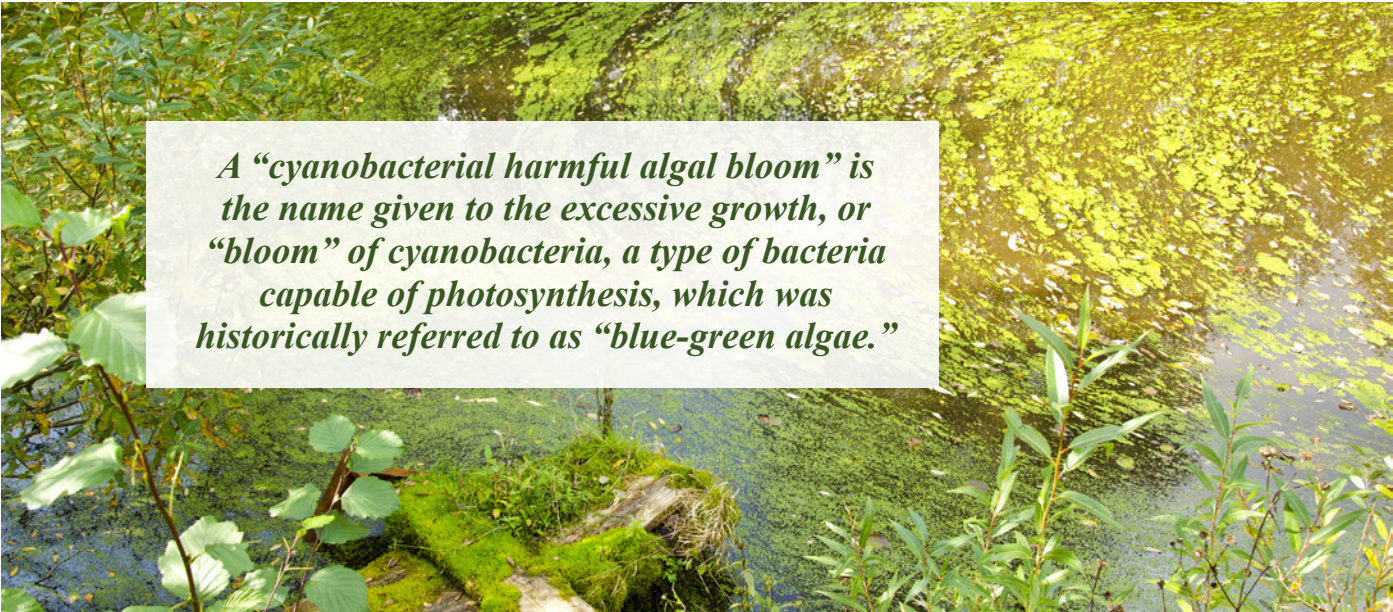
### Respond to the Impact of HABs on Recreation

The DEP has led development of the New Jersey Cyanobacterial Harmful Algal Bloom Response Strategy

(Response Strategy) implemented in 2017 (HAB-1). The purpose of the Response Strategy is to provide a unified statewide approach to respond to cyanobacterial HABs in freshwater recreational waters and sources of drinking water, and to protect the public from risks associated with exposure to cyanobacteria and related toxins. The Response Strategy identifies entities responsible for response and actions; recreational risk thresholds and appropriate responses to protect public health and safety; acceptable parameters and methods for assessing risk; and recommended advisory language and other related communications. The scope of the Response Strategy is for freshwater lakes, ponds, rivers and streams with potential public access, recreational use, public recreational bathing facilities as defined in N.J.A.C. 8:26, and sources of drinking water.


### Protect Drinking Water

Protecting drinking water sources from adverse HABs impacts is key to public health as cyanotoxins caused by harmful algal blooms which manage to break through treatment processes can cause short term health impacts. Direct drinking water related HAB concerns are addressed by DEP's Division of Water Supply & Geoscience's emergency protocol for responding to and handling HAB/cyanotoxin events that affect a drinking water source (HAB-2). The protocol outlines the communication during a HAB/cyanotoxin event, including coordination between all Water Resources Management programs, Division of Science and Research and other DEP programs as appropriate, and the network of public water systems impacted by the HAB.



*A “cyanobacterial harmful algal bloom” is the name given to the excessive growth, or “bloom” of cyanobacteria, a type of bacteria capable of photosynthesis, which was historically referred to as “blue-green algae.”*





*Since 2020, the DEP has hosted an annual HAB Summit to bring environmental professionals across the state together to discuss how harmful algal blooms impact the health and safety of waterways. The event provides an opportunity for experts to discuss how to prevent, monitor, forecast, control, and respond to this growing concern.*

This action also addresses the critical aspect of effective and transparent communications regarding the impacts of HABs on drinking water. Working in close consultation with the Drinking Water Quality Institute and other key stakeholders, the DEP is considering a rulemaking process which, if adopted, would provide clear pathways for DEP to compel public water systems to act if a HAB occurs in its source water. This would include guidance on how best to prevent, mitigate, and treat HABs/cyanotoxins as well as having public water systems who are at risk plan for HAB events as part of their existing Cyanotoxin Management Plans.

DEP's HAB Research Committee, which provides technical consultation regarding HAB bloom response, implements portions of the Science Agenda component of the Governor's HABs Initiative, and conducts literature-based evaluations and applied research to advance effective policy solutions for New Jersey.

### **Invest in Infrastructure Improvements and Research to Reduce Future Risk**

The last two actions focus on HAB-related research and ensuring funding for entities to improve infrastructure and processes to protect and advance public health. In order for

policy makers to adequately scope and address the extent of the HAB problems, state agencies must conduct further research on HABs that can aid in the determination of the most effective strategies for prevention and treatment, including an assessment of potential treatments on aquatic biota and long-term impacts (HAB-3). Because HABs can be fueled by nutrients and warming waters, projects such as extending sewer service or other infrastructure that help mitigate cyanobacterial blooms could help prevent or lessen the impacts of HABs.

In partnership with the NJ Infrastructure Bank, the DEP forms the NJ Water Bank which provides low-cost funding to support water infrastructure projects. These projects provide improved water quality and water service, while minimizing the costs to residents. This money is operated through the State Revolving Fund. Eligible public water systems and local governments can use the money to improve drinking water, wastewater, or stormwater services (HAB-4).



*“Ensuring the state maintains its vibrant wildlife in extreme heat conditions is important for aquatic species like fish, particularly in a state where fishing is not only a popular recreational activity but a large economic contributor.”*







**PRIORITY 3:**  
**PROMOTE COORDINATED**  
**GOVERNANCE**












A critical, but often overlooked, component of efforts to ensure resilience action at the state level is the ongoing coordination needed to ensure that key actors work together effectively. Avoiding duplicative or conflicting efforts ensures taxpayer dollars and constrained funds are effectively allocated, and municipalities are receiving the best, most efficient assistance from executive branch departments and agencies. We must be aligned, as climate impacts will reach all of our government structures, our economies, and our communities. Extreme heat is an impact already being felt, and in advancing the third priority of the Climate Change Resilience Strategy, we

seek to take a coordinated approach to addressing it at the state level through this action plan.




The Interagency Council on Climate Resilience, established by Executive Order 89, recognized the threat of extreme heat and organized to address this matter across the agencies, determining how best to use funds and allocate resources. Collaborative governance and an ever-present focus on climate resilience prompted this plan and will continue to inform efforts for the state of New Jersey. Actions herein are of a regulatory and legislative nature, and identify legal measures for addressing extreme heat.

## 2023-2024 EXTREME HEAT SURVEY RESULTS

### State Agency Resilience Actions Should:

- 1  Protect public health and safety
- 2  Identify funding, finance and investments needed to implement the action
- 3  Encourage coordination of government
- 4  Be science-based
- 5  Align with greenhouse gas reduction goals

### Greatest Perceived Barrier to Enhancing Resilience in NJ:

- 1  Lack of Political Will
- 2  Lack of Business or Industry Support\*
- 3  Not enough money\*

\*Tied



Trenton, NJ





## Legal & Regulatory Affairs, Legislation & Advocacy (LRA)

### LRA ACTIONS

Number	Name	Status
<b>LRA-1</b>	Evaluate Amending Rules and Regulations around Vegetative Mitigation	
<b>LRA-2</b>	Build Climate Resilience into Contaminated Site Remediation and Restoration Plans	
<b>LRA-3</b>	Cooperate on Multistate Climate Change Policy and Litigation Advocacy	

Action Key:



Recommended



Ongoing/Underway



Completed



State agencies must act within the limits of their legal authorities. The Interagency Council on Climate Resilience has identified specific instances in which legislative branch action is required, or where intentional and strategic state advocacy can help to advance desired outcomes.

### Leverage Existing DEP Authority

The Department of Environmental Protection (DEP) can influence local land use, conservation, coastal zone protection, and brownfields redevelopment efforts to advance extreme heat resilience by leveraging regulatory authority and administrative guidance materials. The DEP commits to developing a concise and cohesive report that will ultimately provide the basis for rule changes within DEP programs to benefit the environment by reducing the urban heat island effect in New Jersey (LRA-1).

In this report, DEP will assess adapting vegetative cover requirements in the Coastal Zone Management (CZM) rules to address extreme heat. Changes may include research to identify tree types and their spacing or placement in areas most in need of heat mitigation, reducing the allowable amount of impervious surface or researching types of impervious surfaces that might mitigate against extreme heat. Another potential change is



considering extreme heat vulnerabilities in provisions of the Freshwater Wetland, Highlands, Flood Hazard Act, and Coastal Zone Management rules. These changes would focus on rules related to restoration and mitigation, such as reinstating the requirement for replanting within the riparian zone. Using the best available climate modeling, DEP will evaluate the path forward for potential rule amendments and synthesize recommendations in the report.

DEP continues to focus on “responsible parties”, who are being held accountable for resolving the liability associated with contaminated sites through settlement action. DEP is working on the restoration and remediation of over 14,000 contaminated sites, and will work to build climate resilience, including heat resilience, into the remediation and restoration plans for those sites (LRA-2). While contaminated sites can be located anywhere in the state, many are located within urbanized areas where increased greening can help to reduce heat gain as compared with blacktop surfaces. As part of those projects, DEP will encourage increased vegetation and tree cover to mitigate and prevent the effects of extreme heat, as well

as minimize impervious surfaces such as asphalt. DEP has the power to negotiate with responsible parties to alter deed restrictions and to encourage restoration projects as well as other conservation opportunities through the use of Classification Exception Area restrictions.

### **Cooperate with Other States on Policy and Advocacy**

Lastly, in recognition of the broader context of planetary warming that is driving the extreme heat trends observed in New Jersey, the Office of the Attorney General within the New Jersey Department of Law and Public Safety will continue to cooperate with other states to advocate with the federal government for regulatory, statutory, and litigation change seeking to mitigate the effects of climate change in general, and extreme heat specifically (LRA-3). Advocacy efforts may relate to a variety of topics already discussed in other areas of this Extreme Heat Resilience Action Plan, including workplace safety regulations, expansion and deployment of electric vehicles, reduction of greenhouse gases, and federal disaster declarations for extreme weather events.







**PRIORITY 4:**  
**INVEST IN INFORMATION**  
**AND INCREASE PUBLIC**  
**UNDERSTANDING**

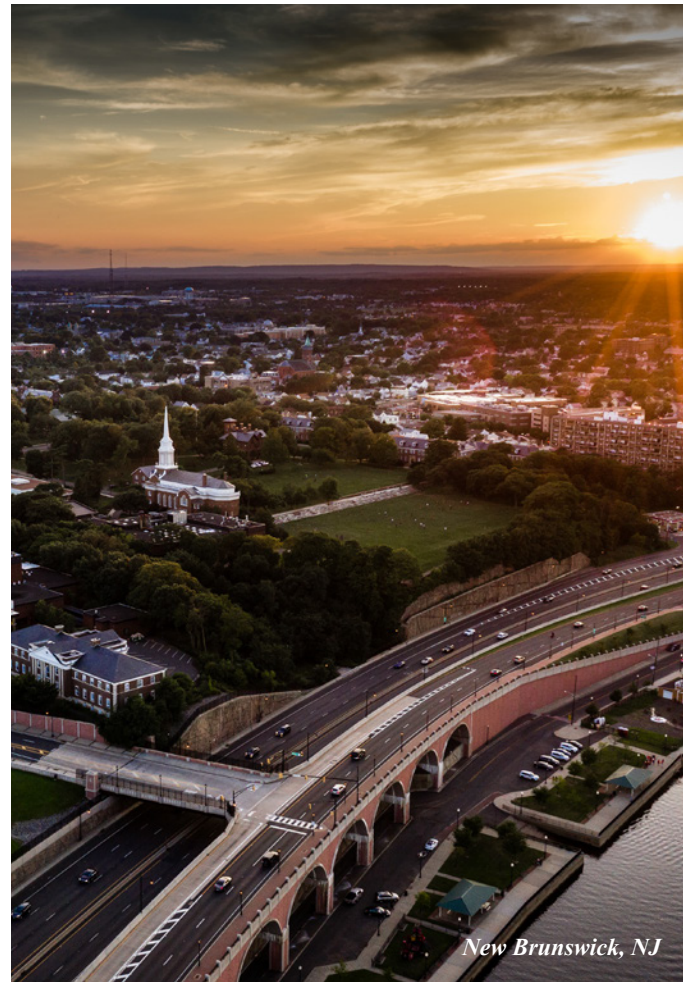






The science surrounding climate change is constantly advancing, and therefore continuously evolving our understanding of its impacts. Continuing to study and research is imperative to expand our knowledge of specific impacts, such as extreme heat, and better plan for them. Actions within this chapter, in alignment with Priority Four of the Strategy, seek to advance the scientific understanding of extreme heat as well as improve communication and outreach surrounding the subject.

Increased temperatures will inevitably affect all members of New Jersey's population, both directly and indirectly. A wide range of information on the effects is still needed; from those on ecosystems and human health, to the way heat impacts our infrastructure and economies. It is the priority of the state to not only fund and conduct this research, but ensure that information is disseminated to the public in effective and useful ways. The role of state agencies here is to make sure that New Jersey residents are well informed about the impacts of extreme heat and the resources available to them. Socially vulnerable populations are of particular focus in terms of communications and education as they are most often at risk from high heat events. Informational campaigns are often the best way to reach people at home, and so efforts to increase public knowledge will allow the state to assist residents in making informed decisions in extreme heat conditions.



## 2023-2024 EXTREME HEAT SURVEY RESULTS

### Respondents' Awareness of Cooling Centers:

**24%**

of respondents Are Not Aware of Cooling Centers but Would Like to Know More About Them.

**4%**

of respondents Are Aware of Cooling Centers and Have Used Them.

### Top 3 Topics Respondents Want to Learn More About:

1



How your locality is planning for high-heat events

2



Guidance for air quality, water quality, and public health during extreme heat days











The effects of extreme heat on plant and animal ecosystems








## Advance Scientific Understanding of Extreme Heat (ASU)

### ASU ACTIONS

Number	Name	Status
ASU-1	Conduct Temperature-Related Literature Reviews	
ASU-2	Ground Truth Surface Temperature Observations	
ASU-3	Monitor Changes in Surface Water Temperatures	
ASU-4	Assess Sea Surface Temperature Extremes	
ASU-5	Study Offsite Runoff Effects on Trout Streams	
ASU-6	Improve Understanding of Heat-Related Climate Vulnerability of Marine Resources	
ASU-7	Update New Jersey Climate Model Projections	
ASU-8	Develop a Series of Technical and Applied Research Workshops	

#### Action Key:

 Recommended    Ongoing/Underway    Completed



Climate change is challenging our society in a variety of new ways, including extreme heat. In order to make good management decisions that will benefit and protect the health and wellbeing of New Jerseyans and their environment, it is critical that the State utilize the best available information and resources to inform its actions. To that end, investments in practices such as monitoring and assessment enable access to baseline data and ongoing tracking of change over time, which facilitate the understanding of future trajectories and better position decision makers to enact policies that can be targeted or broadly applicable, where appropriate.

The actions under this focus area represent the types of activities the State can support that further our scientific understanding of extreme heat and its impacts. Described in more detailed in the following paragraphs, State agency commitments include summarizing and synthesizing current data records, continuing or initiating monitoring activities, and providing assessments and projections for anticipating impending changes in the environment and organismal responses. In no way should this list be considered comprehensive, as there are undoubtedly numerous additional actions that can be taken to advance



our scientific understanding of extreme heat. However, these actions were identified as realistic and achievable steps for progressing in this important endeavor.

### Summarizing and Synthesizing Current Data Records


The State and its constituents have invested in data collection efforts to understand climate, weather patterns, adaptability of plants and wildlife, and environmental risks to human health for generations. Many of these records are readily available in databases and scientific literature, which could be used to leverage an up-to-date understanding of the historical context and specific risks associated with increasing temperatures. For example, there should be a detailed report that prioritizes a more comprehensive and State-specific understanding of how extreme heat can impact air quality that staff scientists can assess global, regional, and State studies and provide key takeaways, while identifying knowledge gaps for further research.

Further examples of topics that may be worth prioritizing for New Jersey-focused literature reviews include increasing risk of waterborne illnesses, drivers and impacts of marine heatwaves including potential effects

on red tides, impacts to agriculture (food quantity and nutritional quality), thermal tolerance of the State's cold-blooded animals, and temperature effects on the chemical dissolution of contaminants (ASU-1). The 2020 New Jersey Scientific Report on Climate Change and its 2022 addendum covering Climate Change Impacts on Human Health and Communities are examples of products that can be generated through this literature review process.

### Continuing or Initiating Monitoring Activities

The next set of actions focus on monitoring activities, both ongoing and the initiation of new monitoring priorities. We seek to enhance our understanding of how temperatures vary spatially across the State by ground-truthing satellite temperature data with surface temperature monitoring and data analyses, allowing more informed and focused intervention strategies (ASU-2). This will include a concerted effort to install new instrumentation along various gradients (e.g., land use types, distance to water, distance to green space) to enrich the current data sets. In addition, the monitoring of surface water temperature changes of streams helps to identify when streams are not attaining temperature standards or other water impairments (ASU-3). Further, collecting data and



*“State agency commitments include summarizing and synthesizing current data records; continuing or initiating monitoring activities; and providing assessments and projections for anticipating impending changes in the environment and organismal responses.”*





*“...utilizing downscaled global grid data would refine our understanding of State-specific temperature projections under different emissions scenarios that are aligned with the newest International Panel on Climate Change (IPCC) reporting and the Shared Socioeconomic Pathways.”*

assessing changes in coastal sea surface temperature is vital to understanding impacts to our recreational and commercial fisheries, as well as protecting humans and wildlife from diseases and pathogens impacting New Jersey’s marine waters (e.g., red tide, a specific type of health-harmful microscopic algae that turn water red, kill fish and make shellfish dangerous to consume) (ASU-4).

The State is looking to better understand the impacts of extreme heat at the interface of our natural and built environment. A specific and novel monitoring program is focused on how stream temperature changes immediately following summer rain events may cause sudden water temperature shifts that could potentially impact water quality and organismal health. Understanding how runoff from land surfaces (e.g., blacktops) impact surface water temperatures, particularly in trout streams that harbor cold-water dependent species, is critical to protecting species important for both recreation and consumption to the people of New Jersey (ASU-5). As for our marine environments, monitoring surface water temperatures ties in with continued development of thermal habitat shift models and climate vulnerability assessments, as part of ongoing efforts towards marine resources management and thermal resilience into the future (ASU-6). Such efforts continue cooperation with regional fisheries management bodies (e.g., Mid-Atlantic Fishery Management Council and Atlantic States Marine Fisheries Commission) to build more secure and resilient marine populations of shellfish species and enhance regional networking and surveillance of disease and pathogenic species in coastal waters.

### **Provide Assessments and Projections for Anticipating Impending Changes**

Finally, utilizing downscaled global grid data would refine our understanding of State-specific temperature projections under different emissions scenarios that are aligned with the newest International Panel on Climate Change (IPCC) reporting and the Shared Socioeconomic Pathways (ASU-7). This is necessary to more accurately assess changes in average temperature over time. With this updated data, we can consider application of historic variability as a potential new range for future extreme heat scenarios. Outputs from these assessments can be used by local municipalities to better prepare for the unfortunate consequences of heat waves which are anticipated to increase throughout the rest of the century.

The effort to scientifically understand extreme heat impacts across New Jersey is a burgeoning field of research. Academic leaders from a diverse set of colleges and universities throughout New Jersey are actively structuring rigorous and community-informed research efforts centered around questions such as: what constitutes “extreme”? How do hot weather phenomena affect communities, vulnerable populations, infrastructure and natural systems differently? How does extreme heat interact with other public health concerns, such as poor air quality? And what interventions have been proven to work to mitigate extreme heat risks and vulnerabilities? By organizing a series of convenings, the Office of Climate Resilience hopes to significantly help to advance knowledge-sharing and help form an informal community of practice among scientists whose academic insights can accelerate progress towards shared climate resilience outcomes in New Jersey (ASU-8).



## Communications & Outreach (COM)



*DEP Outreach for NJ FRAMES*

New Jersey is taking proactive steps to combat the dangers of extreme heat in vulnerable communities through increased awareness, education, outreach, surveillance, and distribution of informational resource and materials. The state recognizes the need to invest in communication campaigns and targeted training and education efforts to support individual, local, regional, and state resilience. Combined, these efforts aim to invest in quality information regarding extreme heat and increase public understanding and awareness of the issue, an essential aspect of reducing its impacts.

Heightened awareness empowers individuals, fosters government accountability, and drives positive action. The more the public becomes aware of available resources and tools, the greater the outcome will be in helping New Jerseyans protect themselves, their families, and their communities from the dangers of extreme heat.

### COM ACTIONS

<i>Number</i>	<i>Name</i>	<i>Status</i>
<b>COM-1</b>	Develop a Cool Buddy Program	
<b>COM-2</b>	Develop an Extreme Heat Resource Guide for Vulnerable Communities	
<b>COM-3</b>	Develop a Comprehensive Training Program	
<b>COM-4</b>	Develop Education Resources for Small Businesses	
<b>COM-5</b>	Launch Meadowlands Climate Change and Heat Extremes Education Campaign	
<b>COM-6</b>	Conduct Extreme Heat Public Outreach to Veterans and Their Families	
<b>COM-7</b>	Expand Surveillance, Analysis, Tracking, and Publication of Heat-Related Illness Data and Educational Resources	

*Action Key:*



Recommended



Ongoing/Underway



Completed





### COM ACTIONS (CONT.)

Number	Name	Status
COM-8	Develop Heat Hub NJ and Launch Extreme Heat Education and Outreach Campaign	
COM-9	Leverage Social Media Communications for Visitors to State Parks, Forests and Historic Sites	

Action Key:



Recommended



Ongoing/Underway



Completed

New Jersey state departments and agencies have and will continue to take the following actions to improve communications and outreach regarding extreme heat and strive for coordinated and consistent messaging.

### Build a Cool Buddy Program

The Department of Human Services (DHS) recognizes that certain populations are disproportionately affected by extreme heat, driving them to develop several programs. The first is the “Cool Buddy” program that fosters connections among seniors. Leaders will guide this program by identifying vulnerable neighbors and setting up systems to check on each other (COM-1). Additionally, DHS will develop a resource guide for older adults, adults with disabilities, and low-income individuals. In doing so, DHS will collaborate with its network and partners to ensure correct messaging and implementation (COM-2).

### Provide Targeted Information to Key Audiences

The Interagency Council will collaborate to develop training materials and guidance for diverse professionals such as librarians, first responders, recreational staff, and healthcare providers, among others, who are called to assist during extreme heat preparedness and response activities. Providing these actors with proper training is essential to ensure that community members have access to safe and cool environments and essential educational materials during and in the lead up to extreme heat events. (COM-3).

The Department of State (DOS) will work with the Business Action Center, Small Business Advocates, and the Cannabis Commission to educate small businesses on extreme heat and provide resources for them (COM-4).

The New Jersey Sports and Exposition Authority (NJSEA) visitors are affected by extreme heat while visiting the Meadowlands. NJSEA will address this issue by launching the Meadowlands Climate Change and Heat Extremes Education Campaign. The campaign aims to educate the public, school groups, organizations, and agencies about the dangers of extreme heat in the Meadowlands district to spread awareness (COM-5).

The Department of Military and Veterans Affairs (DMAVA) focuses on soldiers, Veterans, and their families. In doing so, DMAVA will conduct a customized heat education campaign. The campaign includes outreach events where they will present information regarding extreme heat issues, cooling options, and

*“The more the public becomes aware of available resources and tools, the greater the outcome will be in helping New Jerseyans protect themselves, their families, and their communities from the dangers of extreme heat.”*





utility assistance. Additionally, DMAVA aims to provide descriptions and contact information on utility assistance programs, Veteran's assistance groups, local cooling centers and Veteran, military, and family service centers at these events (COM-6).

### Launch a Statewide Information Campaign

The Department of Health (DOH) will widen its scope of surveillance, analysis, tracking, and publishing of heat-related illness data and educational resources. Moreover, DOH is actively working on creating an array of heat-related illness prevention education and outreach resources. These resources cater to diverse audiences, including the public, healthcare providers, workers, campgrounds, schools, and youth camps (COM-7).

The Interagency Council (IAC) created Heat Hub NJ, a comprehensive online resource on all things heat-related in New Jersey. Heat Hub NJ is designed to be a “living” resource that will continue to expand to include new and different information and resources available from the State. In advance of the summer 2024 season, member agencies and department representatives coordinated to add the following key updates: a series of videos

outlining the physical and mental impacts of extreme heat and how best to protect yourself and your community; new information on the toll extreme heat has on mental functioning and resources to address those stresses; a new section on identifying and dealing with extreme heat emergencies, or heat waves; and Chill Out NJ, an interactive mapping feature to help New Jerseyans find public places to escape the heat. A workgroup of the IAC is leveraging information from Heat Hub NJ and other sources to disseminate extreme heat information in partnership with relevant state agencies, county/municipal officials and other trusted messengers. This campaign utilizes social media and printed materials to disseminate information about extreme heat emergencies and community preparedness actions. The DEP plans to coordinate integrated outreach, communication, and education on extreme heat and institute metrics for determining communication and action effectiveness (COM-8). Another related action that DEP will implement is using social media to communicate with visitors and staff at state parks, forests and historic sites regarding extreme heat events. This communication will include messages informing the public to stay hydrated during extreme heat events (COM-9).





**PRIORITY 5:  
PROMOTE  
CLIMATE-INFORMED  
INVESTMENTS AND  
INNOVATIVE FINANCING**





## PRIORITY 5: PROMOTE CLIMATE-INFORMED INVESTMENTS AND INNOVATIVE FINANCING



The fifth priority of the Climate Change Resilience Strategy highlights the need for the incorporation of climate change-related impacts into fiscal decisions and investment in long-term resilience of the state. Here, various agencies seek to continue and expand their respective funding programs, making them as effective and available as possible, particularly in relation to the concerns of extreme heat. Government agencies are largely responsible for distributing federal and state funds, and directing these funds towards climate resilience is imperative. A wide variety of agencies contribute to this chapter with actions addressing their various programs. Many of these actions include existing grant programs that are currently available to local governments, while some target heat-specific technology and infrastructure. Inclusion of extreme heat concerns into these programs increases our understanding of the associated risks and allows for smarter, long-term investment. Investing in heat-related interventions across state agencies allows New Jersey to establish the resilient communities we seek to create through the culmination of our efforts.



### 2023-2024 EXTREME HEAT SURVEY RESULTS

#### Top Extreme Heat Concerns Selected by Respondents:



Cost for AC/Cooling

2



Impacts to Own Health



Impacts to Health of Loved Ones



Finding Shade Outside



Having to Work in Excessive Heat



No/Limited Access to AC





## PRIORITY 5: PROMOTE CLIMATE-INFORMED INVESTMENTS AND INNOVATIVE FINANCING

### Funding Program Revisions and Financing (FF)

#### FF ACTIONS

Number	Name	Status
<b>FF-1</b>	Continue Implementation of the Natural Climate Solutions Grant Program	
<b>FF-2</b>	Identify, Prioritize, and Incentivize Water Bank Projects that Incorporate Green Infrastructure	
<b>FF-3</b>	Support Communities Using Transportation Set-Aside Funds for Shade Improvements	
<b>FF-4</b>	Launch a Multimodal Shade Tree Initiative	
<b>FF-5</b>	Develop Extreme Heat Underwriting Guidelines	
<b>FF-6</b>	Incorporate Extreme Heat Risk and Opportunities into Incentive Programs	

#### Action Key:



Recommended



Ongoing/Underway



Completed



*Green Roof in Jersey City*

Protecting the health, safety, and welfare of New Jerseyans is central to the mission of state agencies and authorities. The actions outlined in this Resilience Action Plan seek to collectively build more equitable, sustainable, and vibrant communities, even under changing climatic conditions. Adapting to higher temperatures, and longer and more intense heat waves, requires new policies and programs, but it also necessitates revising existing programs to increase funding and financing for mitigating and responding to extreme heat events. Throughout this Action Plan, agencies have detailed efforts—both planned and underway—to invest in and incentivize activities that address the threat of higher temperatures. This focus area details existing or planned funding and finance programs that will be modified to better address extreme heat.

#### Encourage Retrofitting Through Existing Programs

In reviewing existing programs, many agencies identified programs that provide grant funds to communities to enhance the sustainability, safety, livability, and equity in outdoor community spaces across the state that could encourage reducing the retention of extreme heat in the built environment and provide shade. For the Department



of Environmental Protection (DEP), one such activity is the continuation of the Natural Climate Solutions Grant Program, which funds on-the-ground nature-based projects to mitigate the impacts of climate change, including urban heat island effects (FF-1). Another program that already incentivizes green infrastructure is the Water Bank, where the NJ Infrastructure Bank prioritizes stormwater projects in urban areas that use green infrastructure. These projects, particularly designs that include curb tree boxes, rain gardens, and other practices to minimize pavement land cover, limit the retention of heat in developed areas (FF-2).

For users of public transportation networks, shade is critical to prevent heat illness in cases of extreme heat. To help facilitate the retrofitting of shade structures, the New Jersey Department of Transportation (NJDOT) will promote the benefits of shade features in the Transportation Alternatives Set-Aside program to encourage applications to incorporate cooling elements. This program is federally funded, administered by NJDOT, and provides grants for community based “non-traditional” surface transportation projects with potential to create a transportation experience beyond normal expectations (FF-3). Additionally, the

## FF ACTIONS (CONT.)

<i>Number</i>	<i>Name</i>	<i>Status</i>
<b>FF-7</b>	Implement the Federal STORM Act	
<b>FF-8</b>	Identify Bidding, Services, and Contracting Opportunities to Prepare for Extreme Heat	
<b>FF-9</b>	Provide Emergency Resources to Small Businesses During Extreme Heat Events	

### Action Key:

Recommended Ongoing/Underway Completed



*Urban Canopy in Camden, NJ*





## PRIORITY 5: PROMOTE CLIMATE-INFORMED INVESTMENTS AND INNOVATIVE FINANCING

Infrastructure Bank seeks to include manufactured multimodal shade structures (in addition to shade trees) as an activity that can receive Transportation Bank financing in conjunction with an eligible pedestrian/sidewalk project (FF-4). Additional efforts to reduce the threat of extreme heat on transportation networks and their users are detailed in the Transportation focus area.

### Retrofit and Invest in Housing

For retrofitting existing housing, New Jersey Housing and Mortgage Finance Agency (HMFA) will explore updating its multifamily rental financing underwriting

guidelines to require that rehabilitation projects provide cooling units to all residents where a central system is not possible. Moreover, HMFA will consider allowing increased spending on heat-related mitigation techniques for Supportive Housing projects. Such changes will increase access to cooling for individuals and families across the state (FF-5).

As New Jersey continues to invest in sustainable economic development, the Economic Development Authority (NJEDA) will incorporate extreme heat risk and opportunities into incentive programs. Emphasizing vulnerability assessments and climate adaptation planning documents as part of scoring criteria for incentive programs is an opportunity to prioritize green urban design and landscaping improvements that mitigate extreme heat in urban environments and advance the state's environmental justice goals at the same time (FF-6).

### Leverage Newer Finance Programs

The New Jersey Office of Emergency Management seeks to expand low-cost public finance options dedicated for resilience projects through new and existing programs, in alignment with the "Safeguarding Tomorrow through Ongoing Risk Mitigation" (STORM) Act. This federal legislation authorizes states to establish revolving loan funds that provide hazard mitigation assistance for local governments to reduce risks from natural hazards and disasters. This effort is ongoing and will provide an additional avenue for financing local resilience projects across the state (FF-7).

### Improve Access to Appropriate Vendors

As agencies advance the actions outlined in this plan, they may identify goods and services necessary to prepare for and address extreme heat scenarios that are not available under existing state contracts. If contractual gaps exist, Treasury's Division of Purchase and Property (DPP) will work with the Interagency Council to offer additional bidding opportunities to review existing vendors or create contracting vehicles for agencies in support of the Extreme Heat Action Plan implementation (FF-8).

It is not just state agencies that may need to understand contract vehicles. Municipal officials are asked to be in the driver's seat of community-scale adaptation and resilience projects and initiatives, but local capacity for developing well-researched solicitation packages



*Shaded Transit  
Station in Jersey City*





*“...the NJ Infrastructure Bank prioritizes stormwater projects in urban areas that use green infrastructure... particularly designs that include curb tree boxes, rain gardens, and other practices to minimize pavement land cover, limit the retention of heat in developed areas.”*



for climate-related projects is often limited. Promoting state contracts for municipal and county use will help to increase access to reputable entities that can provide heat mitigation materials and professional services. Products and services could include, for example, cool pavement and cool roof options to help public works and facilities managers quickly find and assess available options for mitigating extreme heat risks to public infrastructure and assets. Where possible, contracts could include information on porous pavement so as to facilitate the co-benefit of cool surfaces for both heat mitigation as well as stormwater capture and retention.

### **Provide Emergency Financial Assistance to Businesses**

Lastly, if extreme heat events force the closure of small businesses, damage to community infrastructure, or loss in wages/profits, NJEDA could consider an emergency resources program in response, provided funding is available at that time (FF-9). This has yet to occur in New Jersey, but these actions outline the commitments state agencies are making to proactively prepare for an increase in the disruption and harm caused by higher temperatures and the programs that can be modified in advance to allow agencies to act now and into the future to keep New Jerseyans safe.





NEW JERSEY  
**EXTREME HEAT**  
**RESILIENCE ACTION PLAN**

2024

