CLIMATE

Climate Change is a Public Health Crisis

Perhaps one of the most understated yet wide-ranging effects of climate change is the negative impact it has on human health. While climate affects all of us, health impacts are disproportionately experienced by our most vulnerable populations, leading to a host of equity concerns. In 2019, over 70 US medical and public health groups declared climate change as a "health emergency," and the current trajectory suggests that the negative effects being observed now will compound over time.

From 2011 to 2023, New Jersey received $7.4 billion in postdisaster assistance from the federal government, and there were 14 federally declared climate disasters by county (New Jersey Atlas of Disaster).

Protecting New Jersey's vulnerable populations from the health impacts of climate change will require a holistic, multiagency approach that addresses the root causes of these disparities. It is critical that any incoming administration continue to build on—and expand—the prior administration's work to address climate change impacts.

Historically, New Jersey's low-income communities and communities of color have been subject to undue environmental and public health stressors, including exceptionally high levels of air and water pollution. Additionally, overburdened or environmental justice communities are likely to live near flood zones and have antiquated infrastructure that is not able to handle today's rainstorms. Climate change only exacerbates these stressors.

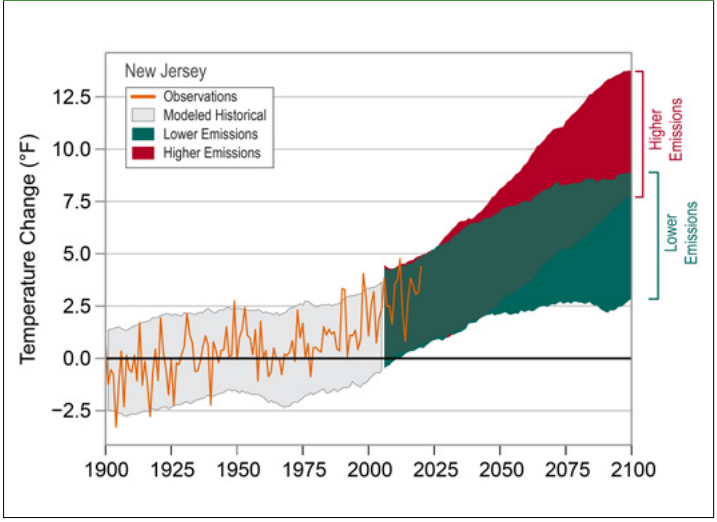
PRIMARY CONCERNS

Heat and Extreme Weather

New Jersey's average temperature is 3.5°F higher than the first recorded figures from 1895, according to a 2020 scientific report by the New Jersey Department of Environmental Protection (NJDEP). Continued warming at historically unprecedented levels is projected, with the state's average annual temperature expected to rise another 4.1 to 5.7°F by 2050.

Overburdened communities are some of the most impacted by this trend, as residents are less likely to have air conditioning and already carry a disproportionate energy burden on their utility bills. These communities also live among an abundance of heat-absorbing paved surfaces that lack shade from tree coverage, thereby increasing these communities' exposure to excessive heat. This is known as the Urban Heat Island (UHI) effect. The effects of urban heat islands are felt disproportionately by formerly redlined neighborhoods, where temperatures are on average 4.7°F warmer than nonredlined areas. Notably, heat-related illnesses led to approximately 10,000 emergency department visits by New Jersey residents from 2013 to 2022.

Observed and Projected Temperature Change

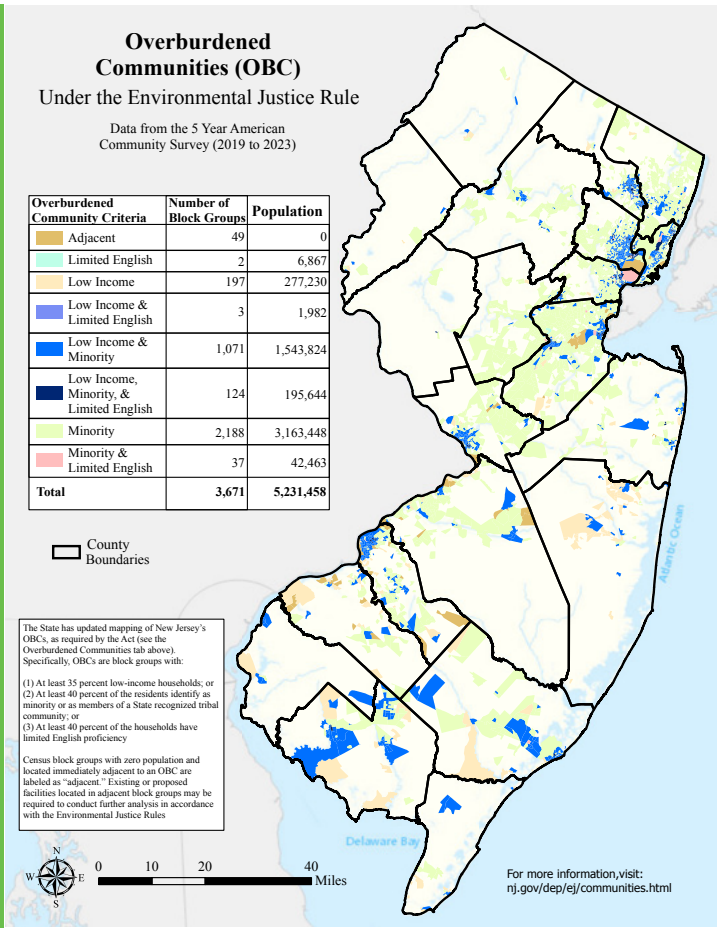


Observed and projected changes (compared to the 1901–1960 average) in near-surface temperature for New Jersey. Source: National Oceanic and Atmospheric Administration's National Centers for Environmental Information

What are Overburdened Communities?

In New Jersey, state law defines an overburdened community as block groups with (1) at least 35 percent of households are low-income; or (2) at least 40 percent of the residents identify as minority or as members of a State recognized tribal community; or (3) at least 40 percent of the households have limited English proficiency.
The state has mapped New Jersey's overburdened communities.

Source: New Jersey Department of Environmental Protection



What is Redlining?

Redlining describes the historic and discriminatory practice of fencing off areas where banks would avoid investments based on the racial makeup of certain communities. This practice was banned under the Fair Housing Act of 1968; however, its legacy has persisted in other ways, particularly where pollution and climate change continue to disproportionately impact former redlined communities.

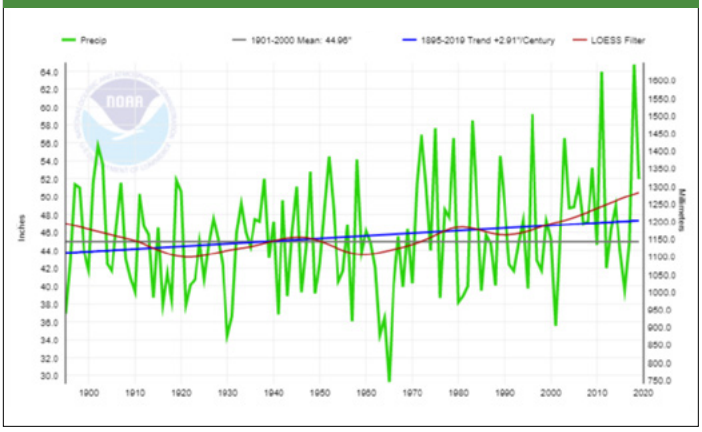
Extreme weather events are also on the rise. Superstorm Sandy—the strongest, most destructive hurricane of the 2012 Atlantic hurricane season—not only caused significant economic losses through damage to homes, businesses, and infrastructure, in addition to the associated losses in productivity; it also harmed the physical and mental health of many residents. The National Oceanic and Atmospheric Administration indicates that, from 1980 to 2024, there were 75 confirmed weather/climate disaster events affecting New Jersey that had losses exceeding $1 billion each. These events included 7 drought events, 4 flooding events, 1 freeze event, 32 severe storm events, 13 tropical cyclone events, and 18 winter storm events.

Flooding and Water Contamination

New Jersey is the most densely developed state, with just over 15 percent of its landmass covered by impervious or paved surfaces, as estimated by New Jersey Future in 2019. This makes stormwater management and water pollution increasingly problematic. Although precipitation varies from year to year, total precipitation has trended upward 2.9 inches per century since approximately 1900, and 2018 was the wettest year on record. In New Jersey, annual rainfall is expected to increase 7–11 percent by 2050, according to a 2020 report from the New Jersey Department of Environmental Protection, and such an increase will likely result in more frequent and intense rain events that cause localized flooding. Indeed, the Federal Reserve Bank of New York found that nearly 1.2 million people in New Jersey are located in properties at a high risk of flooding.

Heavy rains and flooding put many communities in New Jersey at risk of water contamination caused by antiquated combined sewer systems, which were designed to release sewage overflow into nearby waterways when rain overwhelms the system. During overflows, local waterways and streets can be flooded with raw sewage. Direct exposure to sewage, however, has many serious health implications, including an increased risk of infectious diseases, such as cholera, typhoid, hepatitis, polio, cryptosporidiosis, ascariasis, and schistosomiasis. New Jersey has more than 200 combined sewer outfalls, and they are mostly located in large, population-dense cities, such as Newark, Jersey City, and Camden.

New Jersey, Precipitation, January-December



Source: National Oceanic and Atmospheric Administration's National Centers for Environmental Information

Sea Levels are Rising and Oceans are Warming

Sea levels in New Jersey are rising at about twice the global average. The *New Jersey's Rising Seas and Changing Coastal Storms* report and the *New Jersey Scientific Report on Climate Change* indicate that sea-level rise will meet or exceed 2.1 feet by 2050 and increase to 5.1 feet by the end of the century. New Jersey's coastal zone—encompassing 1,792 miles of coastline from the Hudson River southward along Raritan Bay and the Atlantic Coast, and up to the Delaware River—is therefore vulnerable to rising sea levels.

Our atmosphere is not the only thing that is warming. Oceans absorb about 50 percent of carbon emissions along with heat from the atmosphere. This warming causes the oceans to become more acidic and threatens many delicate ecosystems that are major sources of the world's food supply and local fisheries here in New Jersey.

Create a Whole-Government Approach to Mitigate Climate Change

The previous state administration has taken significant steps to address climate change by doing the following:

- rejoining the Regional Greenhouse Gas Initiative
- releasing the *2021 New Jersey Climate Change Resilience Strategy,* the *New Jersey Extreme Heat Resilience Action Plan,* and the *Strategy to Advance Carbon Sequestration on New Jersey's Natural and Working Lands*
- creating a Chief Resilience Officer, Interagency Council of Climate Resilience, and Office of Climate Action and Green Economy
- developing municipal flood resource toolkits and assisting local governments through its Resilient NJ program
- funding natural climate solutions
- launching the New Jersey Green Bank to make investments in the clean-energy sector

It is critical that a new administration retains and builds on these efforts, moving New Jersey even further toward mitigating the impacts of climate change. In addition, it is equally critical that the state helps lead the way on building resilient communities.

While climate change is a global issue that will require a huge amount of international cooperation, coordinated action at the state and local levels is needed. The key to success will be driving state policies, decisions, and investments that align with the goals of addressing and mitigating climate change impacts.

Also critical will be the alignment of state commissions and authorities—including the Highlands Council, Pinelands Commission, State Planning Commission, New Jersey Transit (NJ TRANSIT), New Jersey Sports and Exposition Authority, state agencies such as the New Jersey Economic Development Authority, and others—with these goals.

PRIMARY CONCERNS

- Need for a whole-government approach that provides clear guidance, policies, and strategies for state and local decisions related to climate change mitigation.
- Need for all voices to be at the table in the development and implementation of policies for climate change mitigation and adaptation to ensure an equitable outcome.
- Need for more integration of public health outcomes into climate change mitigation work.

POLICY RECOMMENDATIONS

- Align all revenues across various state programs meant for climate change mitigation, adaptation, and investment in the clean-energy economy under a common strategy or rubric. This alignment should center on equity and ensure that a minimum of 40 percent of monies are dedicated to overburdened communities, especially those most impacted by climate change. Such an alignment is feasible, as demonstrated through current awards of funds from the Regional Greenhouse Gas Initiative.
  - ✓ Require the coordination of relevant agencies and ensure the involvement of the New Jersey Board of Public Utilities' (NJBPU) Office of Clean Energy Equity in the development and implementation of programs through an equity lens.
  - ✓ Oppose proposed cuts to federal funds that support clean energy and climate resilience efforts, and immediately draw down available federal funds.
- Stop diversions of NJBPU's Clean Energy Fund and provide more transparency on how funds are allocated and spent.
- Expand the New Jersey Economic Development Authority's Green Bank, which was proposed to support climate investments.
- Build on the New Jersey Department of Environmental Protection's New Jersey Protecting Against Climate Threats rules and policies, including addressing missed opportunities, and maintain both the position of Chief Resilience Officer and the Interagency Council of Climate Resilience.
- Put forward regulatory proposals to aggressively reduce emissions of carbon dioxide and other harmful greenhouse gases, while equally weighing the most problematic co-pollutants.
- Encourage state agencies and municipalities to utilize the *Sea Level Rise Guidance for New Jersey* documents and develop new guidelines for the consideration of climate change in state grants, loans, contracting, planning, infrastructure, and policy programs and projects.
- Empower local governments to make land-use and infrastructure decisions based on the best available climate science. Continue to provide training or certification in the mapping of climate change hazards and its application to local land-use policies. Ensure that state regulations and policies allow for innovative climate change strategies at the local level (e.g., natural solutions along the entire coastline, green infrastructure, composting).
- Include the social cost of carbon cost-benefit analysis in all new infrastructure and energy projects.
- Provide dedicated state funding for climate resilience.

Adapt to Worsening Climate Impacts

The impacts of climate change are worsening and are increasingly affecting New Jersey's communities. Sea levels are on the rise and are increasing faster in New Jersey than in other states. It is estimated by the Rutgers Climate Resource Center that—depending on the level of carbon emissions—sea levels in the state could rise as much as two feet by 2050 and over six feet by 2100. This would permanently flood portions of New Jersey's communities, make certain areas uninhabitable, and threaten the state's $30 billion shore tourism industry.

Annual precipitation in New Jersey is also expected to increase 4–11 percent by 2050, according to NJDEP, thereby threatening to flood communities and overwhelm the state's aging infrastructure.

Bearing a disproportionate share of the burden are frontline communities, which are typically low-income and/or communities of color, many of which are also often subject to the legacy of environmental injustice. There is a moral responsibility to right the wrongs that frontline communities endure by having an intentional focus on empowerment in the face of these existential threats.

Put plainly, worsening climate scenarios present a growing threat to the well-being and way of life of New Jersey's communities and businesses. Adapting to climate change will require a change in policies, behaviors, and long-established practices.

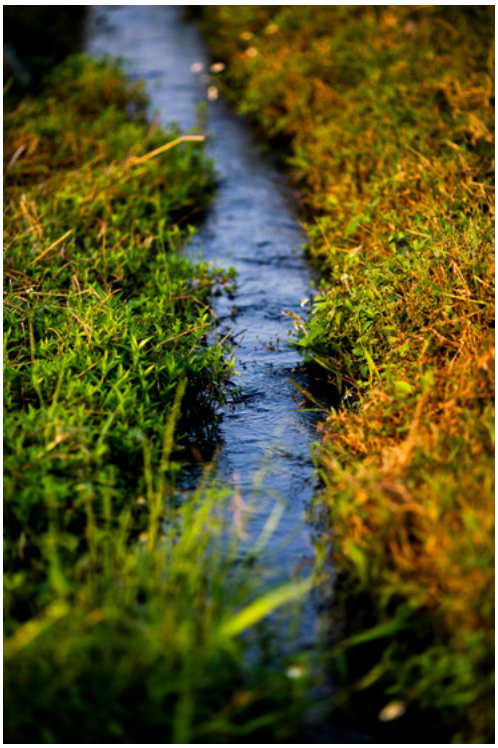
New Jersey must build on this progress, press on, and work quickly to advance these and additional measures, positioning the state as a leader in adaptation planning and implementation. Faced with increased flooding and worsening water conditions, local communities need better tools and resources to prepare for a healthy, safe, and resilient future. Adapting and protecting New Jersey's most vulnerable areas so that they are more resilient to extreme weather and climate change will take time, resources, and planning at the local, county, state, and federal levels.

PRIMARY CONCERNS

- Adaptation is very expensive, yet we have little to no permanent, dedicated streams of funding for planning or implementation.
- Current policies at the federal, state, and local levels still favor living in high-risk flood locations and new requirements for municipalities to build more affordable housing means more people could be placed in harm's way by building in areas that flood.
- Many community members and elected officials favor short-term flood protection measures over long-term transitions out of flood zones.
- While a recent law requires municipalities to perform hazard mitigation planning, many communities lack the capacity to adequately plan for and implement adaptation practices that include forward-looking climate data, such as projected sea-level rise.
- Legal authority for municipalities to implement regulatory and other adaptation programs is uncertain.
- Many municipalities lack the resources necessary to develop well-thought-out plans and to convert those plans into ordinances and land-use policies.
- Communities of color and low-income communities are disproportionately at risk of flooding.

What are the Green Acres and Blue Acres Programs?

The Green Acres Program was created in 1961 to meet New Jersey's growing recreation and conservation needs. The Blue Acres Program, a part of New Jersey's Green Acres Program, helps acquire floodprone properties from willing sellers. The program removes structures and restores floodplains to a natural state.



POLICY RECOMMENDATIONS

- Institute dedicated state funding for climate resilience projects (e.g., bond, insurance surcharge), with a baseline dedication to frontline communities.
- Support the proposed Climate Superfund legislation, which would create a "Climate Superfund Cost Recovery Program Fund" to support climate change adaptation and resilience projects. (See Senate Bill No. 3545 / Assembly Bill No. 4696 in the 2024–2025 NJ Legislative Session.)
- Prioritize critical infrastructure resilience, such as among hospitals and schools.
- Support local governments in their resiliency efforts through the following:
  - ✓ Provide support to municipalities to vacate floodprone areas and ensure protections and regulations are of the highest possible standard, including through the implementation of the New Jersey Resilient Environments and Landscapes rules.
  - ✓ Expand Resilient NJ activities to more inland and tidal communities that experience flooding, and provide technical assistance and funding.
  - ✓ Require proposed affordable housing projects to be located outside of flood hazard zones.
- Increase the funding for the Green Acres and Blue Acres programs, and encourage the use of flood-reduction practices—such as green infrastructure, tree plantings, wetland and stream restorations, and parks with stormwater infrastructure—on Green Acres and Blue Acres properties. Prioritize funding in overburdened communities. Continue to educate the public about the benefits of the Blue Acres Program, which removes properties from floodprone areas and returns the property to its natural state to absorb floodwaters more effectively.
- Require and sufficiently fund the inclusion of forward-looking climate data and the robust analysis of risk and vulnerability in all plans at all levels, from municipal master plans to the state plan.
- Develop measurable metrics and targets for climate change adaptation to provide direction and accountability.
- Establish a regional taxing and planning entity for the state's vulnerable coastal area, similar to the highly successful Meadowlands Commission. This would enable plans and investments specific to the region to be developed and coordinated to protect people and property. It would also capitalize on the Shore as a remarkable cultural and tourism asset.
- Position the state to capitalize on the $25 million in pass-thru federal funding under the Building Resilient Infrastructure and Communities (BRIC) program.

Manage Stormwater Sustainably to Reduce Flooding And Improve Water Quality

Many of New Jersey's communities experience the challenges of stormwater runoff that results in flooding and combined sewer overflows. Stormwater runoff, rain, or snowmelt that flow over impervious surfaces (e.g., streets, sidewalks, parking lots, and rooftops) carry pollutants such as fertilizers, animal waste, trash, debris, salt, and motor oil—often emptying into sewers and waterbodies. As a result of this runoff, a significant percentage of the state's waters are impaired. These issues are exacerbated by increases in the frequency and intensity of rain events due to climate change. Furthermore, the areas with the most impervious cover, and those with combined sewer and stormwater systems, are often home to low-income communities and communities of color.

There are solutions that can help.

Green infrastructure can work in combination with, or in some cases even replace, grey infrastructure (i.e., conventional piped drainage systems) to manage stormwater. Green infrastructure uses vegetation, soils, and natural processes—in effect, adding green features to neighborhoods—to manage water and create healthier environments by reducing polluted runoff and flooding. Green infrastructure works by soaking up and/or storing water, and then slowly releasing it into the ground so that it does not overwhelm the sewer system. Examples of green infrastructure include preserved natural areas, rain barrels, rain gardens, green roofs, and permeable pavement. In addition to the many environmental benefits of green infrastructure, there are also benefits for society and the economy. Green infrastructure can create construction and maintenance jobs, increase property values, improve mental and physical health, and aid in pedestrian safety when located along streets.

In order to increase the implementation of green infrastructure, and therefore improve stormwater management, revisions to regulations and increased funding are needed.

There are many opportunities:

- As of March 2021, the state's Stormwater Management Rules (NJAC 7:8) now require applicants of new developments to manage stormwater with green infrastructure first. This is a significant shift and an important step in the stormwater landscape, but further amendments are needed to improve water quality and reduce flooding.
- In 2023, NJDEP reassigned all former Tier-B municipalities to Tier-A Municipal Separate Storm Sewer permits. Other updates included the mapping of all stormwater infrastructure and the development of watershed improvement plans. These updated permits present an opportunity for stronger stormwater management, if enforced.
- The transportation sector has an opportunity to improve stormwater management through the installation of green streets (green infrastructure installed within the public right-of-way). The New Jersey Department of Transportation can incentivize green streets in its design guidance and grant funding.
- With the passage of the 2019 Clean Stormwater and Flood Reduction Act, local governments are permitted to create stormwater utilities that collect fees based on the amount of stormwater runoff a property generates from its impervious cover. Funds generated from these fees are dedicated to stormwater management and cannot be diverted for other purposes. Without a stormwater utility, the costs of managing flooding and runoff are included in other local government costs—typically in property taxes. This often leads to underinvestment in managing stormwater and can create inequities in who pays, since some property owners do not pay property taxes, while other owners of properties generating runoff do not pay a water or sewer bill. Stormwater utilities create and fund jobs, and a focus on a regional stormwater utility effort would holistically address problems by watershed, as stormwater does not respect municipal boundaries.

Communities are hard-pressed to meet today's many challenges, let alone prepare for those of tomorrow. State government must incorporate climate change projections in planning efforts, regulations, and guidance.

PRIMARY CONCERNS

- Stormwater management is a significant contributor to flooding and waterway impairments. Current funding for today's stormwater management and funding for the needs of the future are clearly not sufficient.
- Municipalities should not be limited in their ability to require stronger stormwater management.
- Harmful algal blooms are becoming more frequent in lakes across the state, due in large part to climate change, increased temperatures, poor stormwater management, and poor local septic maintenance.

POLICY RECOMMENDATIONS

- Amend NJDEP's Stormwater Management Rules (NJAC 7:8) to include the following: an onsite retention standard; the application of rule requirements to redevelopment projects in ways that do not disincentivize smart redevelopment while still improving onsite stormwater management; the incorporation of climate change projection data; a requirement for resilience planning; a requirement of volume and peak rate reductions; and the application of a water-quality standard to all types of impervious surfaces, including roofs and sidewalks.
- Update adopted Total Maximum Daily Loads (TMDLs) to include implementation plans and additional measures for municipalities to adopt in their Stormwater Control Ordinances and reviews of design. Without fully implementing the waste load allocations set forth in TMDLs, the improvement of water quality is unlikely to happen. Both the federal Clean Water Act and New Jersey's Water Pollution Control Act require the restoration of water quality.
- Provide improved guidance and technical resources to municipalities on how to implement their Tier-A Municipal Separate Storm Sewer permits.
- Ensure compliance with new permit deadlines for Tier-A Municipal Separate Storm Sewer permits, including the development of watershed improvement plans (due December 2027). For additional details and deadlines, see the *Understand the New MS4 Permit* report from New Jersey Future.
- Ensure that the next Tier-A Municipal Separate Storm Sewer permit (effective January 1, 2028) has a reasonable schedule for the implementation of projects identified in the watershed improvement plans. That time period should not exceed 20 years.
- Continue to support municipalities and counties examining the feasibility of creating stormwater utilities, including regional utilities, through permanent technical assistance and funding provided by NJDEP.
- Defend and protect federal pass-through programs that fund stormwater management projects, such as 319h and 604b, and increase the allocation where feasible.
- Help the transportation sector use green infrastructure as a way to manage road runoff by amending New Jersey Department of Transportation's (NJDOT) Complete Streets policy to include green streets. Additionally, encourage communities to apply for NJDOT local aid funds to implement green streets and provide technical assistance as needed. Showcase communities that have used funding from the American Rescue Plan Act for Complete and Green Streets.

Promote a Healthy and Resilient Coast

The ocean and coast are dynamic environments that produce ecological and societal benefits. The defining characteristic of many of these landforms—that is, beaches, dunes, and tidal wetlands—is that they are in motion and change in shape, relative position, and elevation. This dynamic environment exists within a range of limits that, when left undisturbed or unaltered, provide a multitude of benefits, some local and some global in scale. However, society continues to intercede in these processes by its use of coastal and ocean resources, overburdening the capacity of the ocean to absorb heat and carbon. Attempts to hold beaches in place for development, and the polluting of estuaries with excess nutrients from stormwater and altered landscapes, degrades the environment to such a degree that benefits from ocean and coastal resources are lost or diminished to New Jerseyans and the coast's ecology.

With over 1,700 miles of ocean, bay, and river shoreline, coastal New Jersey is squarely in the crosshairs of the climate crisis. Flooding from more frequent and intense storms, as well as the eventual permanent flooding due to sea-level rise, threatens to disrupt or displace hundreds of thousands of residents and businesses in urban, suburban, and rural communities around the state, all the while impacting the state's transportation, energy, water, and sanitary infrastructure.

The deluge of water from flooding does not occur solely within specific jurisdictional boundaries, nor are the impacts of flooding comprehensively or consistently addressed in the budgets or by the actions of any one program, department, or agency. Taken as a whole, the authority to act and the resources made available at all levels of government fall far short of what is needed for a challenge of this magnitude. In fact, the governance structure of the state around coastal adaptation and the limited capacity of hundreds of municipal governments, each responsible for the safety and well-being of residents (and particularly those who have been historically marginalized), all threaten the state's ability to effectively meet the challenge to be resilient in the face of climate change.

The good news is that there is interest in protecting, conserving, and enhancing coastal resources by the state. The Jersey Shore touches many peoples' lives and is a tremendous part of the state's economy. Indeed, Jersey Shore tourism in Monmouth County and Ocean County generated nearly $8.6 billion in revenue in 2023, to which one can add $16 billion in additional revenue from Jersey Shore tourism if Atlantic County and Cape May County are included.

The ocean more broadly supports recreational and commercial fishing, as well as an international commerce corridor to the ports of New York, New Jersey, and Philadelphia. Increasingly, the ocean is being eyed as a platform for renewable energy generation, and the role of beaches, dunes, and wetlands in mitigating storm hazards is being recognized.

Tidal wetlands, for their part, provide a multitude of simultaneous services, such as improving water quality and providing habitats to fish, shellfish, and wildlife that are the ecological basis of the bays and waters that support recreational and commercial fishing. They also serve as popular destinations for ecotourism. Additionally, tidal wetlands reduce greenhouse gases through carbon sequestration and provide both wave attenuation and a reduced risk of flooding and erosion, which are increasingly common impacts of climate change.

PRIMARY CONCERNS

- Increasing risk from flooding threatens to disrupt or displace hundreds of thousands of residents and businesses in coastal communities, and threatens infrastructure.
- Many communities lack the administrative, technical, and financial capacity to adequately plan for and implement flood-resilience practices.
- There are few incentives to collaborate or coordinate resilience efforts across municipal boundaries.
- Numerous threats generated primarily by poor development policies and controls along the coast are now exacerbated by stressors associated with climate change. Without significant changes in policy, there will be increasing costs to the public for hazard mitigation and response.
- Sea-level rise is inundating coastal wetlands, drowning them in place. The lack of sediment accumulating on the marsh "platform" keeps them from growing at a pace that would maintain their intertidal nature. While not extensively studied, some estimates put annual losses at almost 6,000 acres per year.
- Overdevelopment of coastal watersheds and the continued failure to manage polluted runoff effectively have impaired the waters of coastal bays and estuaries. Failing sewage treatment facilities and septic systems, as well as ongoing combined sewer overflows, contribute to bacterial contamination and the regular closing of waters to swimming, fishing, and shellfish harvests.
- Frontline communities along New Jersey's urban coast face unique challenges in adapting for climate change impacts, with many opportunities only associated with market-driven redevelopment. In the interim, these communities remain vulnerable to rising seas.

POLICY RECOMMENDATIONS

- Significantly expand the Resilient NJ regional planning program to provide funding for and technical support to additional regional groups of communities at risk from coastal flooding, and ensure that coastal communities make decisions based on the best available flood projection data.
- Continue the Interagency Council on Climate Resilience and ensure that each department prioritizes resilience in their budgets and through their activities.
- Specify mechanisms to enhance coordination between states and relevant regional planning entities, such as the New Jersey Sports and Exposition Authority, ensuring that coastal resilience policies are consistent and that projects advanced in both the coastal zone and coastal areas of regional jurisdictions are held to the highest standards of resilience.
- Instead of a dual review, shift the responsibility of Coastal Area Facility Review Act areas in the overlap zone of the Pinelands National Reserve from the New Jersey Department of Environmental Protection to the Pinelands Commission alone for decision-making. This will assist in increasing efficiency, the consistency of the application of environmental protections, and the expediency of reviews.
- Study the need for a Coastal Commission to better align state and local policies around resilience, coordinate and encourage collaborative adaptation, advance best practices, promote design guidelines, and ensure the presence of representative voices in resilience decisions.
- Incentivize and streamline mechanisms for municipal consolidation, particularly for small coastal communities, to increase potential revenue for struggling areas.
- Reassert control over managing growth along the coastal edge. Now is the time to create opportunities for new climate-friendly economies.
- Create new coastal parks and open spaces proactively in response both to inevitable storm damage and to the need for the mitigation of risk.
- Increase policy and funding support for nature-based solutions to address impacts from climate change. Continue the use of funding from the Regional Greenhouse Gas Initiative for forest and tidal marsh stewardship, and examine new approaches to sediment management within coastal and estuarine systems, living shorelines and habitat restoration, and landscape recovery through the Blue Acres Program.
- Create stronger coastal management policies and state regulations to protect coastal lands and related watersheds, including the Coastal Area Facility Review Act, Waterfront Development Act, Water Quality Management Planning Act, Pinelands Comprehensive Management Plan, and Tidal Wetlands Act.

Climateproof the Meadowlands

The New Jersey Meadowlands is a sanctuary for diverse wildlife, a network of communities where hundreds of thousands of people live, a major industrial and commercial employment center and tourist attraction, and a critical convergence of transportation, energy, waste, and wastewater infrastructure. As one of the state's regionally planned districts, the Meadowlands district serves as a unique model of governance that by nature takes a regional and long-term approach characterized by shared costs and opportunities. Thanks to the tireless efforts of advocates like the Hackensack Riverkeeper and others, the Meadowlands is the tristate region's largest remaining intact wetland habitat.

That said, the impacts of climate change—in particular, flooding from precipitation, storm surge, and sea-level rise—present an existential threat to the Meadowlands. By the end of this century, permanent flooding from sea-level rise could displace between 4,000 and 8,000 Meadowlands residents, and cost 51,000 jobs. The lives of another 40,000 people could be disrupted by periodic flooding from increased precipitation and storm surges, while infrastructure will be threatened by more frequent flooding and saltwater intrusion—a particularly vexing public health problem given the area's concentration of hazardous waste sites.

To begin addressing this challenge, the New Jersey Sports and Exposition Authority, which manages the district, adopted its updated 2020 Master Plan, 16 years after the publication of its predecessor. The plan notably included a chapter on resilience that highlighted the future risk of flooding, referencing estimates of at least three feet of sea-level rise by the end of the century. Recently, a Rutgers University Graduate Planning Studio completed a review of resilience planning in the New Jersey Meadowlands and found that "while there are a variety of efforts underway in the District and throughout the region to consider planning for resilience, these efforts fall short of building public support and a framework for a cohesive approach to climate resilience planning that benefits the Meadowlands region as a whole."

For the Meadowlands to have a sustainable future in the long term, a delicate balance must be struck with climate adaptation and economic development. Resilience must be an integral part of every decision made moving forward.

PRIMARY CONCERNS

- The Meadowlands region is a critical hub of communities, businesses, infrastructure, and ecology that is at significant risk of flooding from climate impacts.
- While under a regional planning management scheme, the Meadowlands District nonetheless suffers from little planning for adaptation or resilience among its 14 communities and other stakeholders, resulting in a lack of a cohesive approach to climate resilience planning.
- Significant adaptation measures will be needed, yet there is no dedicated stream of funding to pay for them.
- Protection for critical wetland habitats remains a primary need.

POLICY RECOMMENDATIONS

- Grant all applicable state-owned open space, natural lands, and waterways in the Meadowlands a special designation that recognizes the Meadowlands as a cohesive unit of park, preserve, or natural-areas system within the state's existing framework of natural-lands stewardship.
- Allow no further destruction of wetlands within the district's boundaries and acquire any high-priority, privately held wetlands remaining in the district. Additionally, better coordinate efforts to protect natural areas.
- Work with local municipalities to develop a comprehensive adaptation plan for the communities, infrastructure, and habitats within the Meadowlands District, including a long-term buyout plan (in partnership with New Jersey Blue Acres) for those properties at greatest risk of flooding.
- Expand the intermunicipal tax-sharing approach to develop a dedicated Meadowlands Adaptation Fund that would help support community- and infrastructure-resilience projects, buyouts, wetlands protection, and other nature-based projects.
- Showcase the Meadowlands as an innovative hub of climate adaptation through partnerships with universities, and through novel approaches that could include a regional climate park.

Explore Natural Solutions to the Climate Crisis

New Jersey's Global Warming Response Act requires the state to reduce economy-wide greenhouse gas emissions by 80 percent from 2006 levels by 2050. *The Global Warming Response Act 80x50 Report* produced in 2020 by the New Jersey Department of Environmental Protection, in conjunction with other state agencies, identifies carbon sequestration in the land sector as one of seven sectors where emissions reductions will be necessary to meet the Global Warming Response Act's 2050 target.

What are Carbon Sinks?

Carbon sinks are places that absorb more carbon than they release. Forests, for example, continually take carbon out of the atmosphere through the process of photosynthesis. The ocean is another example of a carbon sink, absorbing a large amount of carbon dioxide from the atmosphere.

New Jersey's land sector sequestered 8.1 percent of the state's net emissions in 2021, but continued development threatens forests, agricultural lands, wetlands, and forests (over 360,000 acres were lost to development between 1986 and 2015). Rising sea levels threaten coastal wetlands and salt marshes. Conversely, NJDEP estimates that the protection and conservation of New Jersey's natural carbon sinks could increase carbon stored in various land types by up to 33 percent by 2050.

The *Global Warming Response Act 80x50 Report* identifies five potential pathways for maintaining and enhancing carbon sequestration, with a potential additional carbon storage of two to three million metric tons of carbon dioxide equivalent (CO_2e) per year:

1. Afforestation and proforestation
2. Avoided conversion of natural lands
3. Salt marsh and seagrass restoration and enhancement
4. Conservation management of agricultural soils to enhance carbon sequestration
5. Creation of carbon-reserve forests and stewardship to promote and protect sequestered carbon

In New Jersey, proforestation—allowing intact preagricultural forests to continue to mature—represents some of the largest opportunities for carbon gains. That said, multiple natural solutions will be needed to defend and enhance carbon while providing important co-benefits, such as clean water, flood control, and wildlife habitat.

What is Carbon Sequestration?

Carbon sequestration is the process of capturing, securing, and storing carbon dioxide from the atmosphere. The idea is to stabilize carbon in solid and dissolved forms so that it does not cause the atmosphere to warm.

PRIMARY CONCERNS

- Our majestic native white-tailed deer have become so overabundant that they are out of balance with nature across much of New Jersey. As a result, their numbers are the greatest threat to New Jersey's forests, causing rapid declines in virtually all species of native forest trees, shrubs, and herbaceous species. With the food web diminishing, scientists point to a negative cascading impact on dozens of species of birds (including songbirds, pheasants, turkeys, small owls, and raptors), insects (including butterflies and bees), and small mammals. Research clearly shows that highly degraded forests that lack regeneration have a lower value for sequestering carbon as well.
- Deer overabundance must be addressed with new approaches, including policy changes, collaboration among stakeholder groups, and ecological restoration methods for our forests. Otherwise, local extinctions will become more prevalent and reforestation efforts for carbon sequestration will not be successful.
- The implementation of practices that improve soil health on New Jersey's agricultural lands is lacking.
- The loss of wetlands releases stored carbon into the atmosphere. Wetland plants regularly remove CO2 from the atmosphere and sequester it in the form of soil carbon, where it can remain for centuries.

POLICY RECOMMENDATIONS

- Accelerate efforts to work with stakeholders to manage deer impacts on forest ecosystems in order to encourage forest health and carbon sequestration.
- Reforest riparian buffers, protect floodplains from development, and reconnect floodplains to their waterways.
- Defend and enhance carbon stored in forests.
  - ✓ Identify suitable sections of publicly owned forests with undisturbed soil and outstanding qualities for designation as carbon reserves.
  - ✓ Ensure that any forest stewardship plans address all components of forest ecology, including structural and habitat diversity, soils, native species, carbon sequestration, wetland communities, water resource protection, and compatible recreational values.
  - ✓ Capitalize on the carbon benefits of forests.
  - ✓ Replant and restore degraded post-agricultural forests that are suffering vast mortality due to the emerald ash borer, other pathogens, and other alien species invasions.
  - ✓ Prevent the conversion of forested lands into development in all areas of the state using open-space acquisition, local ordinances, and other tools.
  - ✓ Defend carbon in the Pine Barrens from being lost through catastrophic wildfires by using modern, ecologically prescribed burning and forestry techniques that maintain the ecological interactions required for species conservation in this fire-evolved and fire-dependent ecosystem.
  - ✓ Restore Atlantic White Cedar swamp forests that sequester vast amounts of carbon in interior portions of the state's coastal plain, which are less susceptible to threats posed by sea-level rise.

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POLICY RECOMMENDATIONS *continued from previous page*

- ✓ Implement reforestation projects with proper deer management, including urban and community forests that help reduce the impacts of New Jersey cities' heat islands.
- ✓ Explore the potential to generate revenues for carbon sequestration and forest regeneration on state lands through enrollment in voluntary carbon markets. Ensure that carbon gains are verifiable and do not facilitate continued pollution in environmental justice communities.

➤ Adopt climate-friendly agricultural practices, create additional incentives, and provide technical assistance to help farmers implement practices that improve soil health and increase organic matter, such as:

- ✓ Adding compost to the soil instead of synthetic fertilizers
- ✓ Implementing meaningful soil-protection standards for preserved farmland at the State Agriculture Development Committee
- ✓ Promoting the use of untreated and organic seed to increase the health of the food supply's critical pollinators, since these pollinators are negatively impacted by neonicotinoid-treated seeds, synthetic chemicals, and weather changes created by climate change
- ✓ Converting marginal agricultural lands to forests
- ✓ Promoting the transition of more farmland to less chemically dependent and/or organic production, and working with the Northeast Organic Farming Association of New Jersey to provide technical assistance
- ✓ Providing training and marketing assistance to grow new grain crops that are in high demand
- ✓ Promoting Adaptive Multi-Paddock grazing, an underutilized way to graze cattle that has helped innovative farmers increase carbon sequestration and improve soil health
- ✓ Adopting no-till and reduced-tillage practices
- ✓ Planting cover crops that sequester carbon and reduce erosion
- ✓ Incorporating agroforestry and perennial crops, including bramble, medicinal plants, and more
- ✓ Implementing manure management practices to decrease emissions

➤ Protect Wetlands.

- ✓ Accelerate the conservation and restoration of coastal wetlands and habitats, which are threatened by climate impacts such as rising sea levels, increased storm surges, and development pressure.
- ✓ Implement restoration and preservation techniques for salt marshes in coastal areas by increasing marsh platform elevations, and by protecting marsh fringes to prevent the loss of thousands of acres of tidal marsh, one of the best habitats at sequestering carbon.
- ✓ Research and develop techniques to transform drowned coastal forests lost to sea-level rise into useful, carbon-sequestering habitats.
- ✓ Focus on coastal wetlands, which have a natural adaptive capacity to migrate in response to changes in sea level and salinity environments. Set aside sufficient "migration zones" inland from the marsh edge to protect this opportunity to sustain tidal wetlands. In some cases, existing impediments to marsh migration can be removed to facilitate the process.

Support Climate Education and Career Development in New Jersey Schools

There is a broad consensus among climate scientists that human activities contributing to increases in greenhouse gas emissions are the dominant cause of climate change. To meaningfully act upon the changing climate and changed world, young people require education about its causes, consequences, anticipated future impacts, and possible solutions.

Climate Education

In June 2020, New Jersey became the first state in the nation to incorporate climate change education into its learning standards for K–12 students. Since then, the state has provided resources, such as instructional materials and grants for educators, and has created the Office of Climate Change Education. Preparing youth for the future provides them with the knowledge and resources needed to combat the climate crisis and to forge ahead in the green economy.

Career Development

In New Jersey, career and technical education (CTE), formerly known as vocational education, is offered through county vocational and technical schools. These are schools of choice for students who want to participate in an academic program and at the same time learn a trade while in high school. Career and technical education standards reflect the region's industry needs and best practices, outline a student's path to licensure before graduation, and prepare that student for college after high school graduation, if the student chooses that path. New Jersey's vocational-technical schools follow CTE 9.3 standards, and these should mirror the economy of the Northeast region of the United States in light of New Jersey's plan to transition to a green economy by 2030.

Investing and supporting CTE programs can also dramatically increase the likelihood of high school graduation. In one recent

study of vocational and technical high schools in Massachusetts, low-income students were 32 percentage points more likely to graduate if they attended such schools. It is the state's responsibility to form a technical workforce with skills that will guarantee an equal opportunity for success and advancement in a green economy.

A review of the CTE 9.3 standards found that New Jersey has not incorporated topics related to the study of sustainability, energy, or environmental impact/climate change in the following trades: agriculture, food, and natural resources; arts, A/V technology, and communications; business management and administration; education and training; the finance cluster; government and public administration; human services; and information technology and public safety. Career and technical education educators should receive training on how to embed the new standards into existing standards, goals, objectives, curricula, and lesson plans so that, upon high school graduation, the graduates of such clusters/programs can receive certifications to reflect skills in a green economy trade.

PRIMARY CONCERNS

- Environmental stewardship, environmental justice, and climate change standards are not embedded in the broader CTE standards, and vocational-technical high school curricula lack such critical concepts to reflect best practices. Since green economy opportunities are growing in New Jersey with the input and consultation of environmental organizations and the state's industries, it is imperative that CTE standards are reviewed and updated.
- Failing to update the CTE 9.3 standards compromises the licenses and certificates that the students obtain upon high school graduation.
- Failing to update the CTE 9.3 standards compromises students' abilities to take advantage of the green economy workforce.

POLICY RECOMMENDATIONS

- Continue supporting efforts in climate change education across all nine K–12 standards.
- Consider a teacher certification course for K–12 climate education.
- Update standards to include climate change, the green economy, and green energy through a mandate from the Perkins Act, or through an allocation of funds through the State of New Jersey. Funding would cover consultant expenses and CTE educators' professional development.
- Develop newly revised, customized CTE standards for New Jersey with environmental and climate justice perspectives. The education committees of the legislature, the New Jersey Department of Education, the New Jersey Office of the Secretary of Higher Education, and CTE educators, supervisors, and teachers can work together in this effort.
- Develop a state assessment that certifies vocational-technical school graduates to complete green economy/sustainability best practices for future employment. This effort should be led by the New Jersey Department of Education, the New Jersey Office of the Secretary of Higher Education, and the education committees of the legislature, along with CTE educators.

Establish a Civilian Climate Corps in New Jersey

Shortly after his inauguration in 1933, President Franklin Roosevelt created the Civilian Conservation Corps and affirmed that it would "conserve our natural resources, create future national wealth and prove of moral and spiritual value not only to those of you who are taking part, but to the rest of the country as well." Roosevelt's "Tree Army" ultimately employed over three million young men who planted three billion trees, created more than 700 state and local parks, and constructed trails across the country during its nine years of existence. The Civilian Conservation Corps was not perfect—segregation and discrimination permeated the program. But, if used as a model with equity at its core, a New Jersey program can achieve the same success by creating living-wage jobs in restoration, recreation, and resilience.

By establishing a 21st-century Civilian Climate Corps, leaders in Washington, DC, and New Jersey can put young people to work rebuilding New Jersey's ecosystem. To scale up quickly, the state can build on an existing AmeriCorps program in which young workers implement shovel-ready state, local, and federal plans. This might be most effective at the local level, where fiscal constraints may limit capacity to implement natural infrastructure projects that address climate change impacts, such as flooding and extreme heat.

PRIMARY CONCERNS

- Rapid loss of open space and habitat is pushing thousands of American wildlife species toward extinction and threatening the clean air, clean water, and food supplies that every person in the country needs to survive.
- Scientists warn that human degradation of nature may increase the risks of infectious diseases.
- The rapid loss of natural areas in recent decades has left many communities—especially overburdened communities—with too few parks and recreational areas, exacerbating climate change impacts.

POLICY RECOMMENDATIONS

- Create living-wage jobs for the young and underemployed through the creation of a civilian conservation corps in New Jersey.
- Focus on job creation in underserved communities.
- Identify natural infrastructure projects to address climate change impacts.
- Expand existing workforce development programs such as New Jersey AmeriCorps and county youth conservation corps through the federal AmeriCorps program.
- Convert volunteer programs into jobs programs.

Reduce Food Waste To Reduce Greenhouse Gas Emissions

According to surveys conducted by the Natural Resources Defense Council, 43 percent of food waste is generated from the residential sector, followed by 26 percent from the restaurant and caterer sector. Yet, in 2022, 11 percent of the population in New Jersey was food insecure, meaning they did not have reliable access to sufficient, nutritionally adequate food. Furthermore, the Food and Agriculture Organization of the United Nations estimates that one-third of all food produced globally is lost or goes to waste. If global food waste were a country, it would be the third largest emitter of greenhouse gases in the world.

Due to insufficient systems for food-waste tracking in New Jersey, it is difficult to estimate the full environmental impacts of food waste at the state level. In a national report conducted by ReFed, a national nonprofit dedicated to ending food loss, uneaten food consumes 4 percent of greenhouse gas emissions and 14 percent of all freshwater use. Food waste sent to landfills emits high amounts of methane, a greenhouse gas that is 84 times more potent than carbon dioxide over a 20-year time scale.

Wasted food occurs throughout the food supply chain and can be classified into three groups: food loss from unharvested crops, excess food recovered, and food waste thrown away by consumers and retailers. Excess food usually becomes food waste, as most businesses and retailers generally discard food.

The EPA has created a food recovery hierarchy that offers the best ways to manage food waste. The initial step to prevent food waste is to reduce the volume created at the source, followed by food donation and feeding animals. Thereafter, tactics such

Source: United States Environmental Protection Agency

as its conversion for energy and composting are suggested, while incineration and landfill deposition are recommended as to be avoided.

In New Jersey, a 2020 law requires large food waste generators to separate food waste by source and recycle it if they are within 25 miles of an authorized food waste recycling facility. Authorized food waste recycling facilities include those that use waste anaerobic or aerobic digestion to recycle food waste into renewable energy, compost, and recaptured packaging. Currently, there are only two facilities in the state that qualify.

Despite New Jersey's standing food-donation liability laws, which were enacted over 30 years ago, businesses often do not utilize food recovery programs due in part to misinformation and the lack of education about these protections.

PRIMARY CONCERNS

- Lack of food-waste tracking makes it difficult to measure and understand the problem.
- Continued emissions from food waste sent to landfills does not help meet carbon reduction goals.
- Need exists for better food recovery networks to increase nutritional access for those experiencing food insecurity.
- Supportive regulations are lacking for large-scale food composting facilities, including municipal facilities.

POLICY RECOMMENDATIONS

- Finalize NJDEP's Food Waste Reduction Plan, which is in draft form, and establish the Food Waste Reduction Council.
- Fund and implement education campaigns for schools to minimize food waste in cafeterias.
- Educate industry on donation liability laws and establish food donation networks.
- Support food scrap microhaulers working with local governments to reduce residential food waste.
- Incentivize smaller businesses to implement strategies for food waste reduction and composting.
- Establish uniform standards for food labeling to prevent consumer confusion over expiration dates.
- Reform NJDEP regulations to authorize a tiered permitting system that would allow for small-scale composting sites, as well as state-of-the-art outdoor commercial composting facilities that could qualify as authorized food waste recovery facilities.
- Encourage more co-digestion options for institutions to overcome transportation concerns.