SUSTAINABILITY AND CLIMATE ADAPTATION PLANNING:

an Integrated Guide for Highlands Region Municipalities

Highlands Council
New Jersey

NEW JERSEY FUTURE

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INTRODUCTION

THIS RESOURCE was developed through the vision and direction of the New Jersey Highlands Water Protection and Planning Council (Highlands Council). Charged with protecting and enhancing the natural resources and vitality of the New Jersey Highlands Region, the Highlands Council recognizes the timely importance of preparing the region for climate change-related impacts in the context of environmental sustainability and through local comprehensive planning. Municipalities are experiencing increasing and intensifying climate-related events and conditions. Many are also working to advance equity. State and regional legal and policy requirements are progressing to address these issues. Municipal leadership, engaged community members, and practicing professionals need to synthesize various information, data, and requirements in order to formulate and accomplish appropriate planning goals associated with sustainability, equity, and climate change. To help municipalities approach these considerations efficiently and with meaningful outcomes, the Highlands Council commissioned work to "Develop a Guidance Document and Scope of Services for Municipal Land Use Plan and Environmental Sustainability Master Plan Elements, Including a Municipal Climate Change Related Hazard Vulnerability Assessment." The New Jersey Future Team was awarded the project and developed this guidance document through engagement with a variety of stakeholders and with guidance from the Highlands Council throughout the process.

Experiencing tangible climate change impacts and encountering a suite of emerging rules and policies, municipalities are contending with new and dynamic facets of planning. The approach promoted by this guidance is for municipalities to put forth an intentional effort to comprehensively incorporate all of these elements simultaneously. The guidance provided in this resource is aimed at helping municipalities navigate the complexities of equitable environmental sustainability and climate adaptation planning within a single integrated effort.

A 6-step process is presented for Highlands municipalities to integrate local and regional climate adaptation planning and environmental sustainability planning into their master plans.

STEP 1 approaches comprehensive climate adaptation planning for long-term local and regional sustainability, equity, and resilience outcomes.

STEP 2 outlines an organizational structure for including a Climate Change-Related Hazard Vulner-ability Assessment (CCRHVA) in a Sustainability Reexamination Report as the Land Use Plan Ele-ment (LUPE) in compliance with the New Jersey Municipal Land Use Law (MLUL).

STEP 3 highlights the co-benefits and leveraging of resources available through Highlands Regional Master Plan[1] (RMP) conformance when it is coordinated with the CCRHVA.

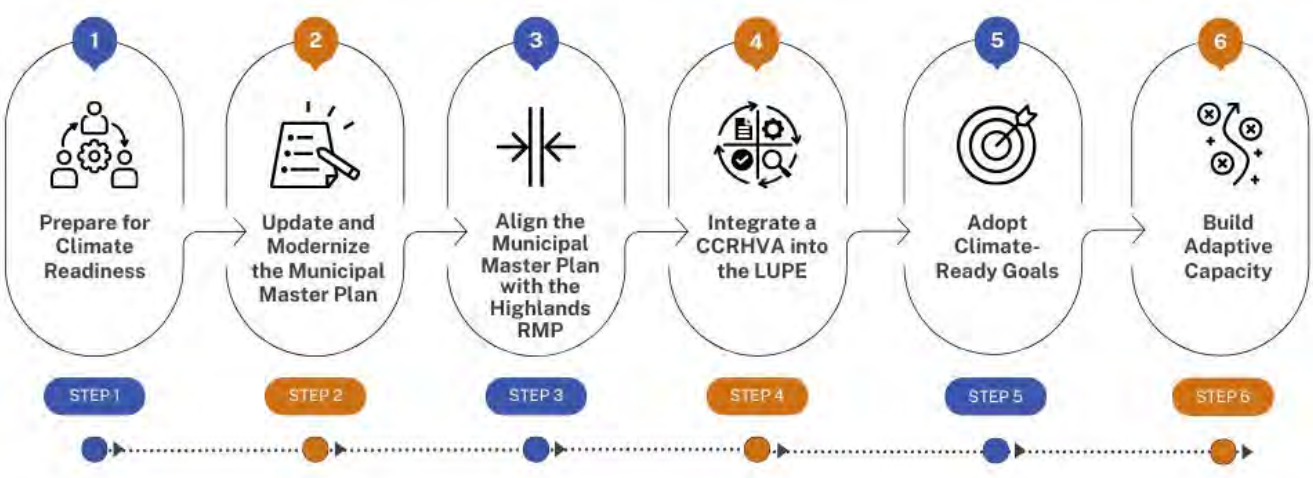
STEP 4 walks through the analysis of climate hazard vulnerability of the Built, Natural, Social, Economic, and Governance Systems with consideration of Highlands Region assets and characteristics, and describes how to use the analysis outputs in the LUPE. It is based on the detailed assessment process described in the "Guide to Local Climate Change Adaptation Planning: The Model Climate Change-Related Hazard Vulnerability Assessment for New Jersey Municipalities" (Model CCRHVA).[2]

STEP 5 details coordinated goals for sustainability and climate readiness to include in the LUPE.

STEP 6 improves municipal governance and adaptive capacity through the implementation of strategies and actions informed by the CCRHVA and embedded in the municipal master plan.

Additional information provided includes CCRHVA assessment and strategy tools, background policy and framing context, and templates for a LUPE, Capital Improvement Plan, Climate Adaptation Action Plan, and Scope of Services for completion of the LUPE of the municipal master plan, including a CCRHVA, intended for municipal use in both seeking professional services to prepare the master plan components and requesting Highlands Council plan conformance grant funding to cover the associated costs.

6 STEPS TO INTEGRATED SUSTAINABILITY AND CLIMATE ADAPTATION PLANNING



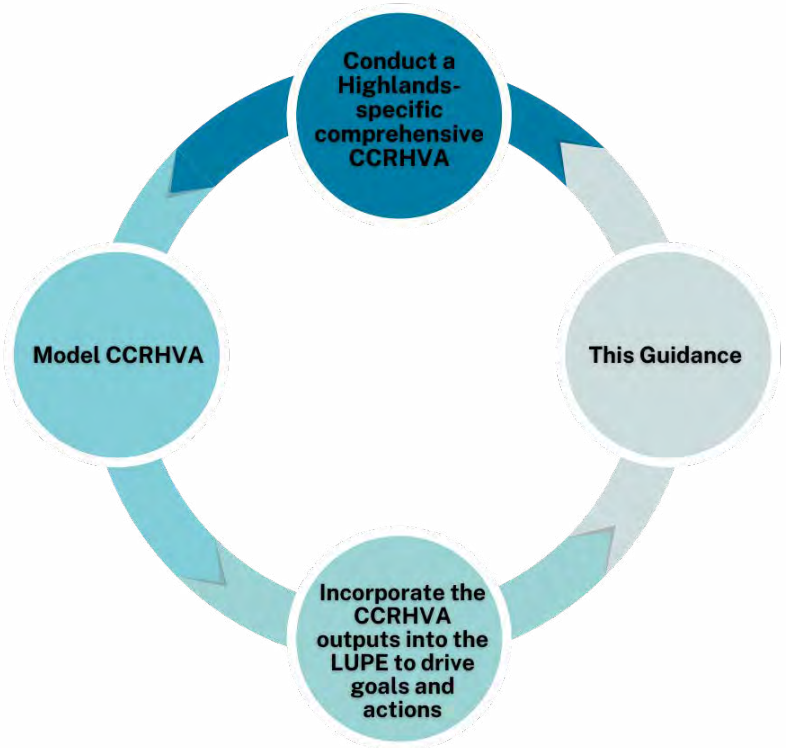
HOW TO USE THIS GUIDANCE

A main purpose of this guidance is to demonstrate how the LUPE of a municipal master plan can incorporate the outputs of a CCRHVA to foster sustainable and equitable future development, while adapting to the impacts of climate change. The focus is on Highlands Region municipalities and how they can use supporting resources provided by the Highlands Council to conduct a CCRHVA and effectively integrate it into sustainability and land use planning.

Rather than interpret the CCRHVA as a separate effort and additional component of the municipal LUPE, this guidance considers a municipal CCRHVA to be the foundational basis of the LUPE, an approach that is described in more detail in Step 2 of this guidance. Furthermore, rather than duplicate guidance for conducting a CCRHVA that is presented elsewhere, this document relies on, and points to, the Model CCRHVA, which was developed in collaboration with the New Jersey Department of Environmental Protection (NJDEP). Both guides can be used by all municipalities across the state and both are designed for practitioners. **Figure 1 describes the relationship between the Model CCRHVA and this guidance for an integrated sustainability and climate change adaptation planning process.**

Because the intent of the Model CCRHVA is to provide an inclusive, comprehensive planning process to address the MLUL, which references specific components of the master plan, these two resources are not mutually exclusive. By using them in conjunction with one another, a municipality can readily develop a LUPE that is grounded in sustainability, reflects identified vulnerabilities to climate hazard impacts, and formulates equitable goals and strategies to address the vulnerabilities. This approach can then serve as the basis for

Figure 1. Complementary guidance resources to conduct a CCRHVA and develop a LUPE. This guidance will help Highlands municipalities conduct a Highlands-specific comprehensive CCRHVA and to integrate the CCRHVA into the LUPE, while the Model CCRHVA provides a step-by-step process for analyzing vulnerabilities to inform integrated sustainability and climate adaptation planning.



integrating the CCRHVA with all local planning efforts, determining appropriate actions to pursue, and then implementing the actions. **Figure 2 shows how these two resources work together when applied to a detailed process of climate change adaptation planning.**

For municipalities that prefer to update the LUPE after completing the CCRHVA, this guidance can be used to assist that process as well. It includes resources for various components and aspects of sustainability and climate adaptation planning in the Highlands Region that can be applied under different approaches. It contains detailed guidance for conducting a CCRHVA, formulating goals, recommending strategies, and developing action plans. It also contains **"PRO TIPS"** to highlight key considerations relating to best practices and local, regional, and state policies.

Keep an eye out for Pro Tips throughout this guide. Green text signifies that there is a Pro Tip associated with it.

A Highlands icon  identifies considerations and actions that have exceptional ability to advance municipal implementation of the RMP, with the recognition that all efforts to promote sustainability are consistent with the goals of the RMP.

KEY ACRONYMS REPEATED THROUGHOUT THIS GUIDANCE

CCRHVA: A Climate Change-Related Hazard Vulnerability Assessment, which is outlined in the Municipal Land Use Law annotated statute, NJSA 40:55D-28, and required in the Land Use Plan Element of any municipal master plan adopted after February 4, 2021. It is a process to identify how climate hazards affect a municipality.

CIP: Capital Improvement Plan

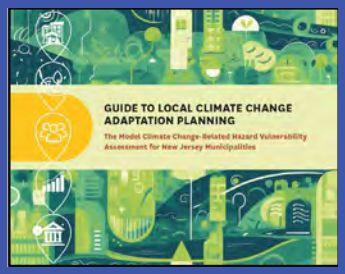
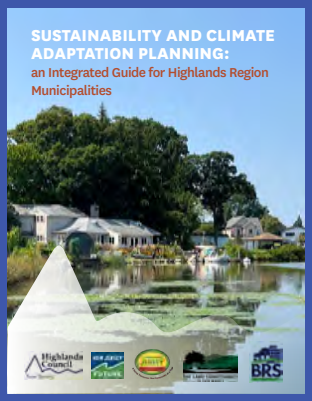
LUPE: Land Use Plan Element of a municipal master plan.

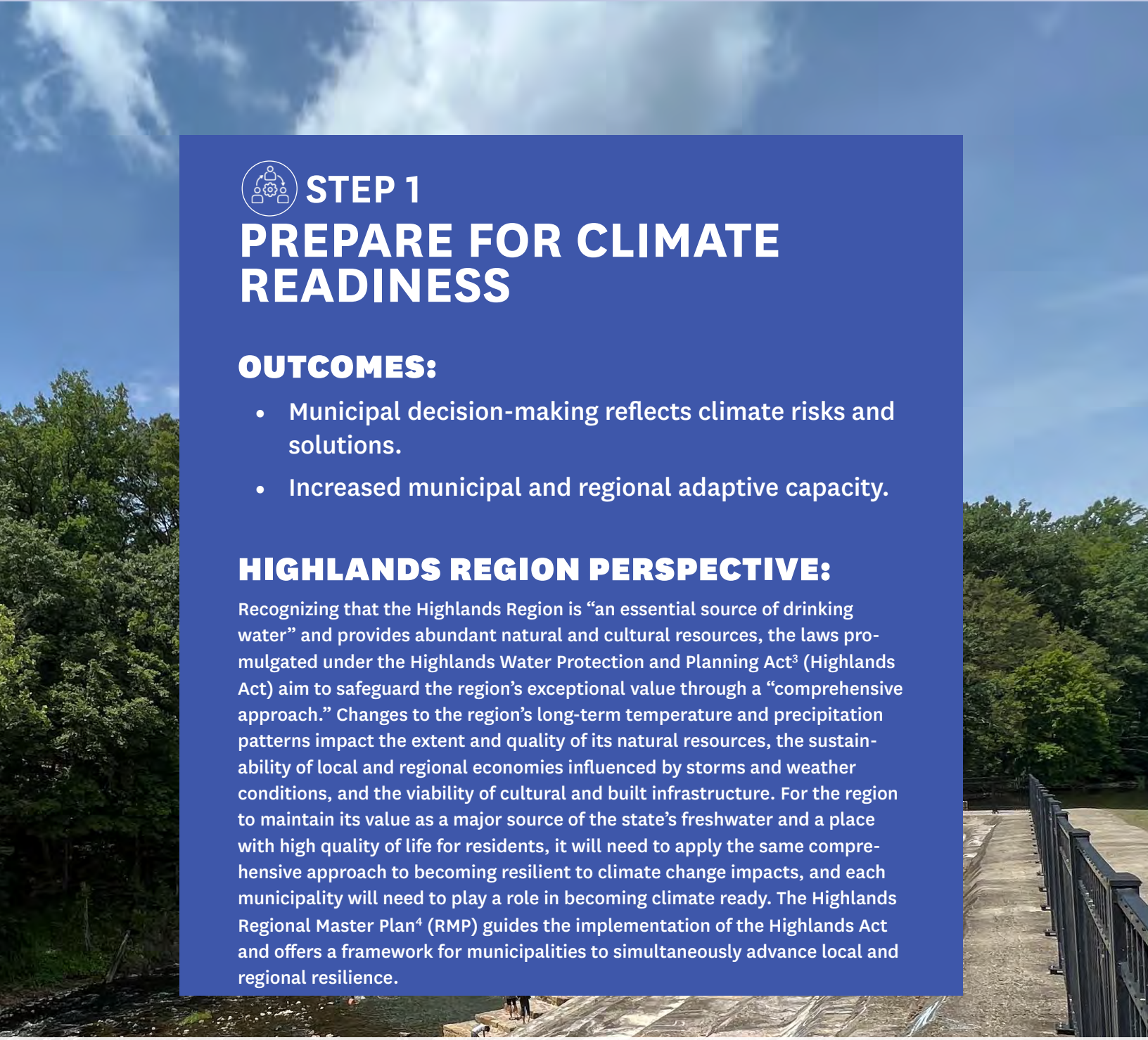
MLUL: New Jersey Municipal Land Use Law (NJSA 40:55D-1 et seq.)

Model CCRHVA: Refers to the "Guide to Local Climate Change Adaptation Planning: The Model Climate Change-Related Hazard Vulnerability Assessment for New Jersey Municipalities," which was developed to establish a standard and best practices for conducting a climate change-related hazard vulnerability assessment.

RMP: Highlands Regional Master Plan

Figure 2. Correlation of the Model CCRHVA with this guidance document

	
PROCESS TO CONDUCT A CCRHVA	**CONDUCTING A CCRHVA TO INTEGRATE INTO THE MLUL**
PART I: GEARING UP AND SCOPING	**STEPS 1-3**
Phase 1: Initiate and Contextualize the Process	Step 1: Prepare for Climate Readiness
Phase 2: Compile and Review Planning Documents	Step 2: Update and Modernize the Municipal Master Plan Step 3: Align the Municipal Master Plan with the Highlands Regional Master Plan
Phase 3: Activate Community Engagement	Appendix: Inclusive Comunity Engagement for Local Climate and Sustainability Planning
PART II: ANALYZING AND PRIORITIZING	**STEPS 4-5**
Phase 4: Analyze Climate Change-Related Hazard Vulnerability	Step 4: Integrate a Climate Change-Related Hazard Vulnerability Assessment into the Land Use Plan Element
Phase 5: Strateegize for Action	Step 5: Adopt Climate-Ready Goals
PART III: TRACKING AND MAINTAINING PROGRESS	**STEP 6**
Phase 6: Implement Climate Readiness	Step 6: Build Adaptive Capacity
RESOURCES	**CCRHVA ASSESSMENT AND STRATEGY TOOLS**
Worksheet 4.2a Analysis Workflow	Highlands-Specific Analysis of Climate Hazard Vulnerability
Worksheet 5.2 Strategies and Design Standards	Climate-Ready Strategies



STEP 1

PREPARE FOR CLIMATE READINESS

OUTCOMES:

- Municipal decision-making reflects climate risks and solutions.
- Increased municipal and regional adaptive capacity.

HIGHLANDS REGION PERSPECTIVE:

Recognizing that the Highlands Region is "an essential source of drinking water" and provides abundant natural and cultural resources, the laws promulgated under the Highlands Water Protection and Planning Act[3] (Highlands Act) aim to safeguard the region's exceptional value through a "comprehensive approach." Changes to the region's long-term temperature and precipitation patterns impact the extent and quality of its natural resources, the sustainability of local and regional economies influenced by storms and weather conditions, and the viability of cultural and built infrastructure. For the region to maintain its value as a major source of the state's freshwater and a place with high quality of life for residents, it will need to apply the same comprehensive approach to becoming resilient to climate change impacts, and each municipality will need to play a role in becoming climate ready. The Highlands Regional Master Plan[4] (RMP) guides the implementation of the Highlands Act and offers a framework for municipalities to simultaneously advance local and regional resilience.

TAKE ACTION:

➔ Work through Part 1 of the model CCRHVA.

➔ Incorporate implementation of the RMP into local climate adaptation planning.

HOW TO APPROACH PREPARING FOR CLIMATE READINESS

ESTABLISH A COMMITMENT TO CLIMATE RESILIENCE

Climate resilience refers to the ability of communities, ecosystems, and infrastructure to recover from and adapt to issues or events resulting from a changing climate, while also minimizing vulnerability to future impacts. It involves not only building capacity, learning, and responding effectively to these challenges, but also improving the systems that support communities. Climate resilience goes beyond addressing risks or mitigating harm from climate hazards post-event; it requires integrating resilience into the core of municipal policies and practices. This approach strengthens both social and ecological systems, enabling them to withstand, learn from, and adapt to the impacts and stresses brought about by a changing climate. It is an ongoing effort that relies on collaboration within communities to enhance the overall quality of life.

> **RESILIENCE** is 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, pursued through a dynamic, iterative, and ongoing process of learning and changing.

The CCRHVA that New Jersey municipalities must incorporate into the LUPE of their master plans, as per the MLUL, is an opportunity to ensure that climate resilience and adaptation are central to local decision-making. Climate hazard vulnerability is a function of **exposure**—the extent people, places, or systems are touched by, or in contact with, a given hazard; **sensitivity**—the extent that they can experience harm from that exposure; and **adaptive capacity**—the extent people or systems can learn from and adjust to disturbances to proactively reduce the causes and the impacts of climate change-related hazards.

Climate change-related hazards are disrupting communities in previously unexperienced ways. The impacts of climate change cannot be ignored in local and regional planning, as they have the capacity to uproot the natural, built, social, and economic systems upon which communities depend.

KNOW THE CLIMATE-RELATED IMPACTS TO THE HIGHLANDS REGION

Relative to the average annual temperature experienced between the years 1901 and 1960, the average annual temperature in New Jersey is projected to rise 4–5 °F or 9–10 °F by the end of this century, depending on a moderate or high carbon emissions scenario, respectively.[5]

Higher Temperatures Impact Highlands Region:

PEOPLE

More days of extreme heat, contributing to greater health-related issues for people, particularly those in urbanized areas, living in structures with no air conditioning, working outdoors, or experiencing social vulnerability due to age, income, preexisting health conditions, and other social determinants of health.

Increased susceptibility to sinkholes in developed karst areas.

ECONOMIES

Reduced downtown shopping and eco- and agri-tourism visits on high-heat days.

Heat stress and drought effects on crops.

Fewer frost days resulting in higher exposure to agricultural pests and diseases.

NATURAL RESOURCES

Reduced water quality through over-heating of aquatic habitats.

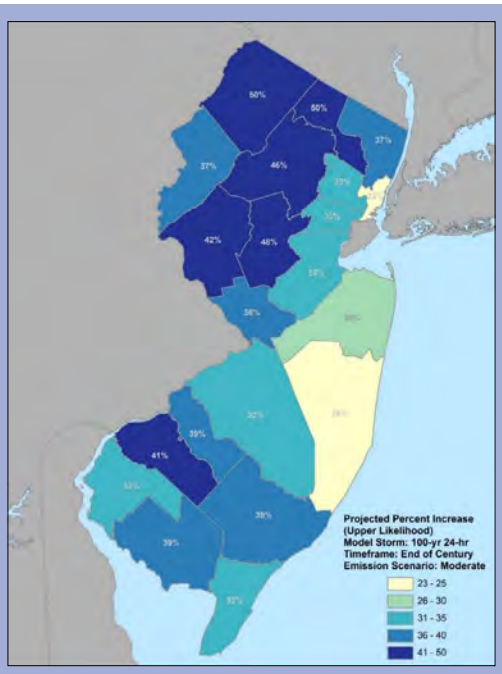
Reduced water quantity through increased evaporation, more drought days, and greater statewide demand for freshwater, particularly from coastal areas subject to saltwater intrusion.

Heat stress and drought effects to natural vegetation and wildlife.

Counties in the Highlands region are projected to see between 37-50% increases in rainfall[6, 7]

Increased precipitation and storms in the Highlands Region, with its steep topography and abundant surface water, means: More flash floods and riverine flooding.

- Increased risk of landslides.
- Damage to infrastructure from flooding, temperature extremes, and fallen trees.
- Unsafe flooded or washed away roadways.
- High soil erosion from farmlands and natural areas.
- Reduced water quality through increased stormwater runoff containing sediment and pollution.



NJ 2021 Rainfall Studies Summary. NJDEP.

CENTER SOCIALLY VULNERABLE POPULATIONS

Everyone is affected by climate change, but the impacts are not experienced equally by everyone. Socially vulnerable populations are disproportionately impacted by climate change.[8, 9, 10] Factors such as age, income, education, race, and ethnicity are major determinants of exposure to climate-related impacts such as poor air quality, extreme temperature, and flooding. Furthermore, individuals already experiencing vulnerability due to a range of societal or individual conditions are less able to prepare for, cope with, and respond to climate impacts.

SOCIALLY VULNERABLE POPULATIONS include people experiencing characteristics that may increase the likelihood of exposure or sensitivity to a climate hazard, including socioeconomic status, age, gender, race and ethnicity, English language proficiency, and disability. This includes populations underserved due to environmental injustices, and low-income and minority populations that have experienced historic under- or disinvestment and are disproportionately burdened by or less able to prevent, respond to, and recover from adverse environmental impacts.

Without addressing the unequal levels of exposure and impact encountered by those experiencing vulnerability, disparities in health and well-being outcomes are inevitably the result. For example, individuals identifying as Black and African American are 34% more likely to live in the areas with the highest projected increases in childhood asthma diagnoses and will be 41% more likely to do so under a scenario of 4°C (7.2°F) of global warming. With 2°C (3.6°F) of global warming, individuals identifying as Hispanic and Latino are 43% more likely to live in the areas with the highest projected reductions in labor hours due to extreme temperatures, and low income individuals are 25% more likely to live in these areas.[11]

In addition to people facing structural racism or exclusion, vulnerable populations can also include individuals with chronic health, physical, or mental conditions or disabilities; older or younger generations; those who are transportation dependent or geographically isolated; those who live in structures more susceptible to climate impacts; and others who should be identified based on the specifics of the community. Vulnerability extends greater

risk of poor health, damage to property, interference with access to employment or necessary services or supports, and other impacts to a subset of individuals in every community. The CCRHVA and planning process must include an intentional effort to identify vulnerable populations in the community and include their input through all phases of the process if it is to be equitable.

CREATE A PATHWAY TOWARD A COMPREHENSIVE CCRHVA

Conducting a CCRHVA is a planning process that includes evaluation of qualitative and quantitative data to score the relative exposure, sensitivity, and adaptive capacity of community assets and features to withstand and cope with climate impacts. Equity and community participation should be centered in the process to be inclusive of vulnerable populations and address racial and economic disparities within the community.

The Model CCRHVA outlines the steps of a 6-phase process that provides detailed guidance for meeting the requirements of each provision of the MLUL. To do so, it encompasses a broad scope of climate resilience that includes impacts of all climate-related hazards—not only flooding and/or extreme heat—on all community systems, including the Natural, Built, Social, Economic, and Governance Systems of the community. Assessing the impacts across all hazards and systems helps identify relevant strategies and design standards, which is also a requirement of the MLUL, reducing vulnerability and building adaptive capacity for local climate adaptation planning. The information learned from the CCRHVA can inform goals for sustaining systems and assist in the visioning, a more resilient, sustainable, and climate-ready community.

UNDERSTAND CLIMATE ACTIONS YOUR TOWN CAN TAKE

There are two general approaches in climate change planning and actions: mitigation and adaptation. Mitigation aims to halt or reverse the rise in global temperatures associated with climate change by reducing the amount of heat-trapping greenhouse gasses in

Key Considerations for Engaging Communities in Climate and Sustainability Planning:[12]

- Conduct "pre-planning" specifically to engage the community at the start of the planning process.
- Foster trust through culturally-aware messaging, transparency in process and goals, and listening to and applying the expertise of the community members. There often exists a culture of mistrust of government or planning initiatives by community members who have not benefited from the distributional outcomes of resources, benefits, or negative impacts.
- Adopt a learning posture throughout the planning process.
- Implement intentional conversations and actions to address the root causes of racial and economic disparities throughout the planning process and in development of solutions.
- Shift the planning process and decision-making framework to center on those in the community who are disproportionately impacted by climate and environmental impacts.
- Solutions and strategies should not only address climate or environmental issues; They should also improve conditions or structures that have created or are creating disparities in the community.
- Build capacity to maintain an ongoing and iterative engagement process and practice equitable governance.

the atmosphere, either by decreasing the source of emissions or by increasing the uptake of atmospheric greenhouse gasses by storage "sinks" such as forests. On the other hand, adaptation recognizes that climate change has already caused significant alterations to the global climate. Even if mitigation efforts succeed, these changes require human systems to adjust and respond accordingly.

Municipal mitigation efforts can be guided by the goals outlined in the New Jersey Energy Master Plan: Pathway to 2050 (EMP). To assist municipalities, Sustainable Jersey developed a Guide for Sustainable Energy Communities. Organized by the seven strategies of the EMP, the guide describes some of the most effective activities municipalities can implement to lower greenhouse gas emissions and how they can create incentives for partners and the wider community to transition to sustainable energy. While the state must take the lead on some efforts, such as setting high sustainability standards in building codes, local entities must also actively plan and implement a broad range of initiatives found in the EMP. The guide describes how municipalities can engage in community energy planning, which is the process by which communities collaboratively select for implementation of local emissions-reducing initiatives that fulfill the EMP goals.

Climate adaptation efforts can be informed by the priorities outlined in the state's Climate Change Resilience Strategy and should align with the RMP that governs the Highlands Region. These efforts can be guided by the municipal CCRHVA because it describes community-specific impacts of climate hazards and identifies strategies and design standards municipalities can implement to address the impacts. Building on the CCRHVA, municipalities can develop a **Climate Change Adaptation Action Plan**. The guidance provided herein helps Highlands Region municipalities update their comprehensive planning efforts based on their CCRHVA and provides strategies to advance climate resilience while implementing the RMP.

PRO TIP

Highlands-consistent resilience planning requires and includes development of a Climate Adaptation Action Plan.

STEP 2

UPDATE AND MODERNIZE THE MUNICIPAL MASTER PLAN

OUTCOMES:

- A sound policy basis for upholding zoning and other decisions in response to climate hazards.
- A baseline from which to measure and monitor climate impacts and adaptation actions over time.

HIGHLANDS REGION PERSPECTIVE:

Municipalities with land designated in the Highlands Preservation Area of the Highlands Region are required by the Highlands Act to demonstrate "plan conformance," a process that brings local planning and regulatory documents into alignment with the goals, policies, and objectives of the RMP. These aim to protect the natural and cultural resources of the Highlands Region while striving to support a sustainable economy. Municipalities that are in the Highlands Planning Area of the Highlands Region are encouraged to align their local plans with the RMP through incentive programs and grant opportunities available to all municipalities in the region. The RMP promotes actions that are complementary to sustainability and climate planning and offers a framework for advancing these efforts through comprehensive planning at the local level. Moreover, municipal master plans that are centered on an assessment of climate resilience and reflect the goals of the RMP help to fulfill the comprehensive approach of the Highlands Act for sustaining the resources of the Highlands Region.

TAKE ACTION:

➔ Compare the existing municipal LUPE with the LUPE Template provided in this guidance to identify necessary updates and changes.

➔ Coordinate updates to all master plan elements and all planning documents reviewed in Phase 2 of the model CCRHVA with Highlands plan conformance or actions in support of RMP goals.

HOW TO APPROACH UPDATING AND MODERNIZING THE MUNICIPAL MASTER PLAN

ORGANIZE THE MUNICIPAL LAND USE PLAN ELEMENT (LUPE)

The MLUL contains the regulatory statutes governing the LUPE of the municipal master plan,[13] which is the town's comprehensive plan for achieving the community's goals for future development. The municipal master plan is the planning document that provides a comprehensive description of existing and proposed conditions and features of the community. It is a visionary document that lays out the goals and strategies for achieving objectives that will sustain and enhance public health, safety, and general welfare. The LUPE is central to the vision of the master plan because it guides appropriate development patterns in the municipality—and development patterns directly affect whether the municipality is providing for appropriate housing, transportation, population density, ecosystem function, economic vitality, cultural assets, public facilities and services, and supporting infrastructure. The LUPE has been described as "the heart of the comprehensive master plan, bringing together and summarizing all of the other elements."[14]

There is no right or wrong way to organize the LUPE of the master plan, and municipalities may approach land use planning differently. Although there is not a uniform or consistent organization of LUPEs among municipalities, there are eight required parts to the element, shown in the table below.

Master Plan Land Use Plan Element (LUPE) Regulatory Provisions (Summarized)

(a) Statement of the LUPE's relationship to the objectives, principles, assumptions, policies, and standards underlying the physical, economic, and social development goals and policies of: the master plan overall, the components contained in the master plan, and the natural and geographic conditions of the municipality.

(b) (Map) showing existing and proposed extent and intensity of each type of land use, including an explanation of the relationship to existing and proposed zoning plan and ordinances.

(c) (Map) showing existing and proposed airports and airport safety zone boundaries.

(d) Statement of recommended standards of population density and development intensity.

(e) (Map) showing existing and proposed locations of military facilities, including strategies to minimize encroachment on and land use conflicts with them.

(f) Statement of strategy concerning smart growth considerations regarding potential locations for electric vehicle charging stations; storm resilience with respect to energy supply, flood-prone areas, and environmental infrastructure; and environmental sustainability

(g) (Map) showing existing and proposed locations of public electric vehicle charging infrastructure.

(h) A climate change-related hazard vulnerability assessment (herein referred to as a CCRHVA).[15]

This guidance does not propose that there should be a uniform format for the LUPE. The purpose of this guidance is to assist with the integration of a CCRHVA into any LUPE. The CCRHVA involves a comprehensive look at how the municipality can achieve climate resilience in broad terms. It entails a process of evaluating features of the systems that maintain and sustain the community and assessing the extent they could be impacted by current and projected changes to climate conditions. As such, the CCRHVA is a foundational component of land use planning in the municipality and should be fully integrated into all land use planning.

Although each municipal LUPE is uniquely organized, they all often contain three types of information:

- a description of historical conditions and trends,
- a description of existing conditions, and
- a set of goals for attaining a future envisioned by the community.

The CCRHVA can serve as a means to provide the description of existing conditions and goals for the future, while also providing baseline information by which to monitor and measure progress and changing conditions.

PRO TIP

A LUPE Template is provided with this guidance.

To incorporate the information gleaned from a CCRHVA, the LUPE should contain considerations for each of the systems that are assessed in relation to vulnerability to climate hazards. Several of these systems already need to be addressed in the LUPE, at least in a statement related to the physical, economic, and social development goals and policies contained in the LUPE (provision (a)), and in the statement of strategy concerning smart growth considerations (provision (f)). The CCRHVA provides an opportunity to include a more comprehensive and holistic account of how development goals and policies intersect with sustaining all community systems, and particularly with conducting environmental sustainability planning, in the context of changing climate conditions. The LUPE should also articulate its relationship to the RMP and identify goals in alignment with the RMP.

Using a systems approach, the CCRHVA evaluates the built, natural, social, economic, and governance systems that support and sustain the community. This evaluation directly aligns with two of the three organizational components of a typical LUPE.

SYSTEMS APPROACH

This guidance is structured around a systems approach to assess climate change-related vulnerability. Description and evaluation of these systems should be included in the LUPE.

Figure 3 demonstrates how the CCRHVA can inform existing conditions and future goals and strategies found in the LUPE.

Figure 3. Using the outputs of the CCRHVA to structure the LUPE.

LAND USE PLAN ELEMENT	CCRHVA OUTPUTS TO INCLUDE IN THE LAND USE PLAN ELEMENT
Description of Existing Conditions	**Characterization of Community Systems, Features, and Climate Hazard Vulnerabilities**
	Description of Community Demographics, Assets, and Challenges Identification of Critical Infrastructure Built System Vulnerability Analysis Natural System Vulnerability Analysis Social System Vulnerability Analysis Economic System Vulnerability Analysis
	Potential Impact on the Master Plan, Other Planning Efforts, and Municipal Capacity
	Development Analysis (build-out and zoning) Planning Documents Review Governance System and Adaptive Capacity Vulnerability Analysis
Outline of Future Goals and Strategies	**Strategies and Design Standards to Reduce Vulnerabilities and Enhance Sustainability and Municipal Capacity** **Description of Implementation of Strategies, Standards, and Ongoing Climate Adaptation and/or a Climate Adaptation Action Plan**

CONDUCT AND ADOPT A MASTER PLAN "SUSTAINABILITY" REEXAMINATION REPORT

One approach to update the master plan is by way of a "Sustainability" Reexamination Report that can be adopted as the "Land Use and Sustainability Plan" Element. It should clearly indicate any specific policies or master plan changes that, upon adoption, will supersede other aspects of the master plan without requiring further amendments. In addition to the CCRHVA, this report should involve a Climate Adaptation Action Plan and an EV Charging Infrastructure Plan.

One of the optional elements of the master plan is the Green Building and Environmental Sustainability Plan Element (GBESP). This is an element where sustainability goals and strategies could conceivably be included in the master plan, and many municipalities have done this. Compliance with the MLUL also requires that several sustainability components be in the LUPE, and a good LUPE will sufficiently recognize environmental sustainability. This guidance considers the LUPE as core to the master plan regarding climate readiness and sustainability. Therefore, the LUPE should contain the main components of a municipal sustainability plan that should be included in a municipal master plan. The GBESP Element can focus on energy efficiency and other aspects of climate change mitigation. Because the LUPE is required to contain information about EV charging infrastructure, the EV Charging Infrastructure Plan should be adopted as part of the LUPE.

ALIGN OTHER ELEMENTS OF THE MASTER PLAN FOR CONSISTENCY WITH THE LUPE

After completing a CCRHVA, the findings should be incorporated into all elements of the master plan. **Figure 4** shows a short list of how climate hazard planning can be integrated into optional elements of the municipal master plan. See the Implementation Goals Resource Document of the Model CCRHVA for more detailed information about master plan elements and how to ensure they align with the CCRHVA to reduce vulnerabilities.

Figure 4. Incorporation of the CCRHVA findings into optional elements of the municipal master plan.[16]

Housing Plan Element	• Analyze the exposure and vulnerability of existing housing and adopt retrofit policies if appropriate. • Consider how to balance demand for housing, especially affordable housing, with pressure to build in high hazard areas.
Circulation Plan Element	• Ensure that transportation infrastructure is in sufficient condition to withstand climate hazards. • Use transportation investments to guide growth to lower hazard locations. • Ensure redundancy in the transportation network (modes, routes) if critical infrastructure nodes may be damaged by hazards. • Control the location of new roads, road improvements, and transportation facilities to account for hazard risks. • Include circulation routes for active transportation, including biking, walking, and micro-mobility devices, to provide alternative evacuation routes.
Utility Service Plan Element	• Ensure all utility improvements and investments account for hazard risks.
Community Facilities Plan Element	• Ensure all facilities improvements and investments account for hazard risks.
Recreation (and Open Space) Plan Element	• Utilize conservation and recreation areas to preserve high hazard areas and limit other, higher density land uses.

Conservation (and Open Space) Plan Element	• Protect and restore natural features that can help mitigate flood and sea level rise, like floodplains, wetlands, marshes, and riparian areas. • Protect and restore natural features that have high exposure or sensitivity to climate hazards. • Preserve vegetation on steep slopes to manage landslide risk and protect water quality. • Designate high hazard areas as conservation areas, or include special development considerations.
Economic Plan Element	• Ensure that investments in redevelopment areas do not perpetuate vulnerability.
Historic Preservation Plan Element	• Ensure that assessments about future risks due to climate change are incorporated into long-term preservation planning.
Recycling Plan Element	• Recognize relationships between climate mitigation to reduce global heating and climate adaptation actions.
Farmland Preservation Plan Element	• Monitor losses to farmers due to climate hazards, and support their efforts to adapt sustainably with soil management best practices. • Preserve lands with agricultural soils.
Development Transfer Plan Element	• Identify opportunities to participate in the Highlands Transfer of Development Rights Program, designating high hazard areas as sending areas.
Educational Facilities Plan Element	• Ensure all facilities improvements and investments account for hazard risks.
Green Buildings and Environmental Sustainability Plan Element	• Adopt strategies that reduce the use of resources like energy and water which can also help support mitigation to disasters. Tie sustainability strategies to hazard mitigation and climate adaptation strategies to ensure consistency.
Public Access Plan Element	• Ensure public safety from hazards such as flash floods and extreme heat in recreation and public access areas.

STEP 3

ALIGN THE MUNICIPAL MASTER PLAN WITH THE HIGHLANDS RMP

OUTCOMES:

- The municipal master plan and development regulations are brought into conformance with the RMP, awarding eligibility for various types of Highlands Council and state assistance and benefits.
- Coordinated land use planning to protect the important resources of the Highlands Region, providing benefits to all Highlands municipalities and communities across the state.

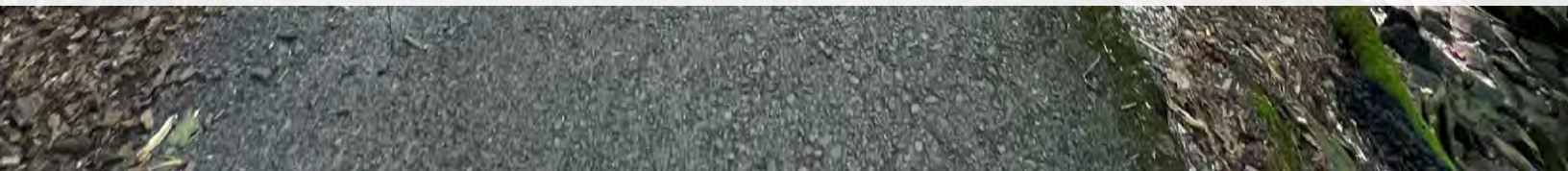
HIGHLANDS REGION PERSPECTIVE:

The Highlands Act was enacted on August 10, 2004. Through passage of the Highlands Act, the Highlands Council was created and charged with the important task of developing the RMP to protect the critical natural resources and other significant values of the Highlands Region. The Highlands Act is premised on the need for coordinated land use planning and regulation to protect the important resources of the Highlands Region. A fundamental aspect of the RMP is the process by which local governments modify their land use requirements and restrictions to support the goals and requirements of the RMP.
The Highlands Act directs the Highlands Council to develop a set of requirements to protect the Highlands Region, which include mandatory restrictions over land use and development practices within the Preservation Area and provisions for voluntary conformance with respect to the Planning Area. The process for towns to demonstrate their compliance with the Act is called Plan Conformance.

TAKE ACTION:

➔ Contact your Highlands municipal liaison to discuss grant funding to review the impact of plan conformance on the municipality.

➔ Leverage the CCRHVA process to update the municipal master plan and development regulations for Plan Conformance.



HOW TO APPROACH ALIGNING THE MUNICIPAL MASTER PLAN WITH THE HIGHLANDS RMP

COLLABORATE WITH THE HIGHLANDS COUNCIL

In accordance with the Highlands Act, the Highlands Council is authorized to "approve, reject, or approve with conditions the revised master plan and development regulations" of Highlands municipalities and counties. The Highlands Council may also "identify changes" necessary for Plan Conformance approval as part of a rejection or conditional approval of a local Petition for Plan Conformance (N.J.S.A. 13:20-14 and 15).

Of the 88 municipalities in the Highlands Region, 5 are entirely in the Preservation Area, 36 are entirely in the Planning Area, and the remaining 47 municipalities have lands in both areas. **Assessment of the Highlands natural systems and resources conducted by the Highlands Council during the preparation of the RMP revealed that important ecosystems and natural resources lie not only within the Preservation Area, but also within the Planning Area.**

PRO TIP

Highlands municipalities can use the Interactive ERI (Environmental Resource Inventory) Tool to review the extent of resources in the town.

SEEK RMP PLAN CONFORMANCE

"Plan Conformance" is the process by which a municipality or county revises its local master plan and development regulations, as applicable to the development and use of land, in order to align them with the goals, requirements, and provisions of the Highlands Act and the RMP. The Highlands Council will review and approve a Petition for Plan Conformance by adoption of a formal resolution during a publicly-noticed Highlands Council meeting, which is subject to the Governor's Review period that follows.

Purpose and Scope of the Plan Conformance Process

The purpose of the Plan Conformance process is to provide a framework that supports the efforts of municipalities and counties in the Highlands Region to bring master plans and development regulations into conformance with the goals, requirements, and provisions of the RMP. The scope of Plan Conformance includes the following considerations:

- All activities undertaken by the Highlands Council or Highlands municipalities and counties to bring master plans and development regulations into conformance with the RMP are considered to be within the scope of Plan Conformance.
- Plan Conformance shall incorporate a process for effective and thorough local government involvement and public input.
- The Highlands Council intends to ensure that Plan Conformance will address local or unique circumstances. The Highlands Council recognizes that the RMP was created at a regional scale and that new or additional information available at the county or municipal level may be utilized during Plan Conformance.

Required Conformance in the Preservation Area

The Highlands Act requires that each county and municipality located wholly or partially in the Preservation Area submit a Petition for Plan Conformance to the Highlands Council for that portion of its jurisdiction lying within the Preservation Area. Petitions for Plan Conformance may include proposed revisions of the county or municipal master plan and development regulations, as applicable to the development and use of land in the Preservation Area, as may be necessary to achieve confor-

mance with the goals, requirements, and provisions of the RMP.

The Preservation Area contains natural resources that should be safeguarded from the degradation of natural habitat and ecosystem services that arise from climate change. The Model CCRHVA contains a methodology for assessing climate hazard impacts on water, land, and air. The outputs of the CCRHVA analysis can be used to inform a municipality's Plan Conformance actions in the Preservation Area.

Voluntary Conformance in the Planning Area

Petitions for Plan Conformance for that portion of a county or municipality lying within the Planning Area may be submitted to the Highlands Council at any time.

Petitions for Plan Conformance may include proposed revisions of the county or municipal master plan and development regulations, as applicable to the development and use of land in the Planning Area, as may be necessary to achieve conformance with the goals, requirements, and provisions of the RMP.

Many of the climate adaptation actions that reduce vulnerabilities in the planning area align with Plan Conformance. Resources can be leveraged by holistically approaching the CCRHVA along with Plan Conformance.

OBTAIN THE BENEFITS OF RMP PLAN CONFORMANCE

In order to achieve a regional approach to land use planning and a coordinated method for the protection and enhancement of the significant values of the resources in the Highlands Region, the Highlands Act provides benefits to counties and municipalities that come into conformance with the RMP. Such municipalities and counties are eligible for the benefits specified below.

Planning Grants and Technical Assistance

The Highlands Council shall make grant funds and other financial and technical assistance available to Highlands municipalities and counties for the reasonable costs of any revision of their master plans, development regulations, or other regulations or plans which are designed to further the Goals, Policies and Objectives of the RMP or for the implementation of a Transfer of Development Rights program pursuant to the Highlands Act.

Plan Conformance grants shall be awarded to municipalities and counties through the approval of a resolution by the Highlands Council. The Council shall provide grant funds for all mandatory aspects of Plan Conformance and may also provide grant funds for discretionary aspects of Plan Conformance as determined by the Council.

State Aid and Assistance for Smart Growth

Highlands municipalities and counties approved by the Highlands Council as being in conformance with the RMP shall qualify for all State aid, planning assistance, technical assistance, and other State-provided benefits and incentives that may be awarded or provided to municipalities and counties which have received Plan Endorsement from the State Planning Commission or have otherwise been acknowledged by the State as practicing or implementing smart growth strategies and principles. These benefits apply to any conforming municipality in the Preservation Area, and subsequent to Plan Endorsement for the Planning Area of the RMP by the State Planning Commission (see part (e) below), to any conforming municipality in the Planning Area. Any such municipality or county shall also qualify for any State aid that may be provided for smart growth projects.

Any municipality or county may include in its Petition for Plan Conformance a listing of priority projects or other matters that are fundamental to the provision, improvement, enhancement, or restoration of infrastructure, public facilities, or other matters that may require the funding, implementation, or active participation of a State agency. The Highlands Council may act to coordinate such matters with the appropriate State agency, where such action is consistent with the RMP, to gain agreements with the appropriate State agency to facilitate, approve, fund, or take other actions

necessary to implement the matter of local priority.

Strong Presumption of Validity, Extraordinary Difference, and Burden of Proof

The master plan and development regulations of any municipality and the county master plan and associated regulations of any county which have been approved by the Highlands Council as in conformance with the RMP shall be entitled to a strong presumption of validity. In any cause of action filed against such a local government unit and contesting an action or decision of the local government unit taken or made under authority granted pursuant to the Municipal Land Use Law, the State Uniform Construction Code Act, or the Highlands Act, the Highlands Act requires that the court shall give extraordinary deference to the local government unit, provided that the municipal or county master plan and associated regulations have been approved by the Highlands Council as being in conformance with the RMP. The plaintiff shall have the burden of proof to demonstrate by clear and convincing evidence that the act or decision of any such local government unit was arbitrary, capricious, or unreasonable or in patent abuse of discretion. This provides another layer of protection for climate adaptation actions adopted by Plan Conformance municipalities based on a CCRHVA that is consistent with the RMP.

Legal Representation

The Highlands Council shall provide legal representation to any requesting local government unit located in the Highlands Region in any cause of action filed against the local government unit and contesting an action or decision of the local government unit taken or made under authority granted pursuant to the Municipal Land Use Law, the State Uniform Construction Code Act, or the Highlands Act, provided that:

- The municipal or county master plan and associated regulations that have been adopted by the municipality or county approved by the Highlands Council as being in conformance with the RMP, and are the subject of the cause of action filed against the local government unit;
- The Highlands Council determines that the act or decision of the local government unit which is the subject of the cause of action is consistent with the RMP;
- The act or decision of the local government unit that is the subject of the cause of action involves an Application for Development that provides for the ultimate disturbance of two acres or more of land or a cumulative increase in impervious surface by one acre or more; and
- In the case of a Planning Area municipality, the municipality shall have adopted a Planning Area Petition Ordinance.

Plan Conformance Deemed Equivalent to State Plan Endorsement

Any municipality or county or portion thereof located in the Preservation Area shall be exempt from the State Plan Endorsement process established in the rules and regulations adopted by the State Planning Commission. With the State Planning Commission endorsement of the RMP, Highlands Council approval of any municipal master plan and development regulations or county master plan and associated regulations through the Plan Conformance process, for lands in the Planning Area, shall be deemed the equivalent of having those plans endorsed by the State Planning Commission and such entities shall be entitled to any applicable State Plan Endorsement benefits.

STEP 4

INTEGRATE A CCRHVA INTO THE LUPE

OUTCOMES:

- Land use planning directives based on an assessment of current and projected hazard impacts across the entire community.
- Data analysis results for addressing indicators of climate hazard vulnerabilities and risks to address.

HIGHLANDS REGION PERSPECTIVE:

When conducting a CCRHVA and seeking information for guiding local comprehensive planning, Highlands municipalities also need to seek approaches and data related to Highlands-specific climate hazard considerations. These include increased susceptibility to risk due to the region's topography; a focus on protecting the region's water, natural, and cultural resources; and leveraging opportunities arising from things like enhanced regional collaboration or even the changing climate itself. A LUPE with an integrated and comprehensive CCRHVA is the foundation for municipal sustainability planning, which can also set the foundation for coordinated regional planning aligned with the RMP.

TAKE ACTION:

➔ Use the Highlands-specific Systems Features and Indicators in this section and the Scope of Services provided with this guidance as the approach to completing a CCRHVA.

➔ Work through Phase 4 of the Model CCRHVA using the Highlands-Specific Analysis of Climate Hazard Vulnerability resource provided with this guidance.

➔ Use the LUPE Template provided with this guidance to update the municipal master plan with the CCRHVA's findings.

HOW TO APPROACH INTEGRATING A CCRHVA INTO THE LUPE

CONDUCT A HIGHLANDS-SPECIFIC COMPREHENSIVE CCRHVA

A local CCRHVA identifies the existing and projected climate-related hazards and evaluates the existing and potential impacts these hazards have on the people, places, and systems of the locality. The MLUL requirements for including a CCRHVA in the LUPE are summarized in the sidebar to the right. General guidance for conducting a CCRHVA is available through the NJDEP's Local Planning for Climate Change Toolkit. The NJ Office of Planning Advocacy provides an overview of the MLUL rule requirements, best practices, and other resources in a Municipal Climate Resilience Planning Guide.

The Model CCRHVA provides a detailed step-by-step process to meet the requirements of the MLUL while performing a local assessment that delivers outputs for holistically advancing sustainability and climate resilience. **The Highlands Council recommends the comprehensive approach described in the Model CCRHVA because it aligns with the RMP by supporting the sustainability of Highlands Region assets and communities.**

PRO TIP

Each feature analyzed in the CCRHVA includes a specific Highlands Region Perspective, described on the following pages, that should be considered in its vulnerability assessment.

The phases of conducting a CCRHVA, described in the Model CCRHVA, are much like any planning effort. They involve working through a process of engaging, assessing, prioritizing, and implementing. Each step in the process has implications for the LUPE of the municipal master plan. Although not all the steps outlined in the Model CCRHVA are required to comply with the MLUL or to complete a CCRHVA, the process outlined in that guide demonstrates best practices for an inclusive and comprehensive process.

MLUL Regulatory Provisions (N.J.S.A. 40:55D-28)

i. Analyze current and future threats to, and vulnerabilities of, the municipality associated with climate change-related natural hazards.

ii. Include a build out analysis and an assessment of the threats and vulnerabilities of (i) identified related to that development.

iii. Identify critical infrastructure necessary for evacuation and sustaining quality of life during a natural disaster, to be maintained at all times in an operational state.

iv. Analyze the potential impact of natural hazards on relevant components and elements of the master plan.

v. Provide strategies and design standards that may be implemented to reduce or avoid risks associated with natural hazards.

vi. Include a policy statement on the consistency, coordination, and integration of the CCRHVA with any existing or proposed Natural Hazard Mitigation Plan, Floodplain Management Plan, Comprehensive Emergency Management Plan, Emergency Response Plan, Post-Disaster Recovery Plan, or Capital Improvement Plan.

vii. Rely on the most recent natural hazard projections and best available science provided by NJDEP.

The initial phases of a CCRHVA involve scoping and initiating the project. Key activities include:

- Building a project team.
- Gathering appropriate baseline data and planning documents.
- Connecting with the right experts, stakeholders, and resources.
- Establishing a strategy for effectively engaging the community through equitable and inclusive outreach during all phases of the CCRHVA.

Drawing from the information and resources of the initial phases, subsequent phases involve:

- Analyzing the community's vulnerability to climate-related hazards.
- Identifying strategies and a corresponding plan to address the vulnerabilities.
- Taking steps to implement strategies, maintain ongoing resilience efforts, and improve adaptive capacity.

The following section describes how Highlands municipalities can fully incorporate the CCRHVA into the LUPE of their master plans, and it corresponds with guidance provided in the "Analyzing and Prioritizing" steps in Phase 4 of the Model CCRHVA. A component of the CCRHVA analysis that is not described in this guidance is the build-out analysis. The LUPE Template provided with this guidance demonstrates how to incorporate a completed build-out analysis into the LUPE, along with the other components of the CCRHVA. **The Highlands Council conducted a municipal build-out analysis for each Highlands municipality, and the outputs of that analysis can be used by the municipality in its CCRHVA, provided it is still accurate.**

The CCRHVA is also contingent on community knowledge. Collaboration and communication with the community are essential in all phases to improve the accuracy of the CCRHVA and undergo an inclusive process for identifying equitable solutions. Working with other government jurisdictions, institutions, and organizations throughout the process will also lend additional support and appropriate strategies for addressing climate hazards that cut across sectors and jurisdictions.

USE THE CCRHVA ANALYSIS OUTPUTS AS LUPE INPUTS

This section will guide Highlands municipalities through the analysis of climate hazard vulnerability detailed in the Model CCRHVA, providing direct relation to Highlands Region assets and considerations. It indicates how each output of each CCRHVA analysis integrates with components of the municipal LUPE.[17] Consistent with the Model CCRHVA, the section is organized by systems—the Built, Natural, Social, Economic, and Governance Systems are addressed **with regard to the LUPE**, the Highlands Region, and state policies.

Conducting and subsequently implementing a CCRHVA embraces four principles:

1. Use a systems approach to analyze municipal vulnerability to a broad scope of climate hazards across all aspects of community safety and well-being.
2. In the LUPE, include and address each system to correlate land development goals with the CCRHVA findings.
3. Incorporate sustainability into climate adaptation planning and implementation by recognizing a dynamic natural environment and providing flexibility for adaptation to and mitigation of climate change.
4. Align all other plans and strategies with the CCRHVA.

The systems approach to climate adaptation planning is described briefly in the Background Information section of this guidance and outlined in detail in a Systems Approach Resource Document of the Model CCRHVA. In the systems approach, one or more features are analyzed for each system, and each feature is analyzed based on one or more indicators as illustrated in **Figure 5**.

The analysis of features based on indicators yields

information that can then be deliberated by the community to determine the relative impact in relation to relevant climate hazards. **Information resulting from the CCRHVA should be used in the LUPE to inform a description of current conditions and propose future land use goals and strategies in relation to each of the features.** Due to the impending environmental changes to communities brought about by the dynamically changing global climate, "current conditions" should also include projected impacts of climate change.

The following pages walk through each system, detailing considerations for analyzing each indicator of each system feature and **the outputs each analysis will yield for integration into the LUPE**. For Highlands municipalities, special considerations of the CCRHVA concern the region's water resources, natural and cultural assets, and unique geography.

Mapping resources provided by the Highlands Council include the NJ Highlands Council Open Data Site for downloading GIS files, NJ Highlands Council ArcGIS Online for viewing the Highlands Council GIS data and map products in an online mapping platform, Highlands Region Interactive Environmental Resource Inventory (ERI) web-based mapping tool for generating descriptive information about environmental features in the community, List of Municipal ERI Portal Links to activate the ERI tool zoomed to a specific municipality, NJ Highlands Council Interactive Map for viewing Highlands Council data and certain state data layers on a web-based mapping tool, and two-foot elevation contour shapefiles derived from 2018 LiDAR for each municipality (digital elevation model and raw LAS files are available from the Highlands Council upon request). The RMP and accompanying technical reports also provide information about environmental, economic, and social features in the Highlands Region.

PRO TIPS

Key considerations of climate adaptation planning are 1) the relationships between climate hazard vulnerability and the vision and goals set for the community in the comprehensive master plan and 2) the protection of Highlands Region resources. Outputs of the CCRHVA are inputs for the master plan and strategies that support the RMP.

- Use the evaluation of current and future development outlined in the Model CCRHVA to consider changes to zoning that will reduce, vulnerabilities of people, property, and infrastructure to climate hazards.
- Key considerations for engaging communities in climate and sustainability planning are listed in Step 1 of this guidance and the appendix contains additional information to support an inclusive climate adaptation planning process.
- Data available through resources developed by the Highlands Council are listed in the CCRHVA Assessment and Strategy Tools section.
- Use the LUPE Template provided with this guidance to update the municipal master plan based on the outputs of the CCRHVA.
- Guidance for how to integrate the CCRHVA outputs into climate-ready goals and strategies for future land use in Highlands municipalities is outlined in the CCRHVA Assessment and Strategy Tools section.
- The CCRHA Output bullet labels under each indicator correlate with climate adaptation strategies provided in the CCRHVA Assessment and Strategy Tools section.

Figure 5. The systems, features, and indicators evaluated in the Model CCRHVA.

SYSTEM	FEATURE	INDICATOR
BUILT SYSTEM	Facilities & Infrastructure	Physical Damage
		Operational Damage
	Housing Stock & Businesses	Residential & Commercial Structures
		Public & Affordable Housing Siting
NATURAL SYSTEM	Natural Lands Resources	Protected Natural Lands & Buffers for Migration
		Biodiversity & Connectivity
		Urban Ecology
	Water Source Resources	Water Quality
		Water Quantity
	Air Quality	Air Pollution
SOCIAL SYSTEM	People	Public Health
		Vulnerable Populations
ECONOMIC SYSTEM	Sustainable Economic Development	Jobs
		Non-Residential Tax Base
	Working Lands	Farming
	Outdoor Recreation	Agri-Tourism
		Eco-Tourism
GOVERNANCE SYSTEM	Equitable Land Use	Land Use Ordinances
	Community Engagement	Studies
		Programs
	Jurisdictional Plans & Accountability	Code Enforcement
		Staffing
		Budget & Funding

BUILT SYSTEM

FACILITIES & INFRASTRUCTURE

Physical Damage

Operational Damage

HOUSING STOCK & BUSINESSES

Residential & Commercial Structures

Public & Affordable Housing Siting

FEATURE: FACILITIES & INFRASTRUCTURE

Indicators for Climate Vulnerability Analysis of Facilities & Infrastructure

PHYSICAL DAMAGE | OPERATIONAL DAMAGE

LAND USE PLAN CONTEXT

The information gleaned from the CCRHVA about facilities and infrastructure should serve as the baseline for ongoing monitoring of potential damage to these components of the built environment tracking reduction of built structures in areas of hazard exposure, and maintainance of function and services provided by facilities and infrastruc-ture equitably.

According to the MLUL, to conduct the CCRHVA, the community must identify "critical facilities, utilities, roadways, and other infrastructure that is necessary for evacuation purposes and for sustaining quality of life during a natural disaster, to be maintained at all times in an operational state." Because that may be inclusive of a large number of features that a community identifies, priority facility and infrastructure features should then be selected from the features identified in order to evaluate climate hazard vulnerability. Many of the facility and infrastructure features serving a community are not under the jurisdiction of the municipality, making it necessary to work collaboratively with operators and other government partners to assess and address climate vulnerabilities to these features.

HIGHLANDS REGION PERSPECTIVE

The Highlands Region is rich in historic and archaeological assets, which can be damaged or destroyed by an acute hazard event or by a process of degradation influenced by climate factors such as heat exposure, high humidity, or sediment accumulation caused by frequent flooding. Historic preservation efforts will need to consider the various ways in which these resources can be impacted by different climate hazards.

The physical geography of the region also distinguishes it from the rest of the state concerning risks associated with climate change due to the presence of carbonate rock areas that may contain karst topography. Development in carbonate rock areas may be more prone to damage with changes in climate because karst areas are susceptible to sinkholes and other karst features affecting development of a site.

STATE AND REGIONAL POLICIES AND PLANS

Flood and Stormwater Ordinances and NJ PACT: Municipalities should go beyond minimum requirements to adopt ordinances that clarify that publicly funded improvements or new facilities and infrastructure will comply with the stormwater rules.

Hazard Mitigation Planning: Municipalities should promptly integrate the list of the community's critical infrastructure features, and their climate hazard vulnerabilities, into the appropriate chapter or annex of their Hazard Mitigation Plan (HMP).

PRO TIPS

The NJDEP adoption of the Inland Flood Protection Rule requires municipalities to update their Stormwater Management Control Ordinance by July 2024. This is an opportunity for a municipality to consider passing an enhanced ordinance to go beyond the state minimum requirements to reduce flooding and maintain or improve water quality.

Municipalities should integrate the CCRHVA and corresponding strategies as an addendum in the appropriate chapter or annex of their proposed HMP. These plans are completed on 5-year cycles, and municipalities should establish corresponding update cycles and regular dialogue as the need arises to align the CCRHVA with the HMP.

INDICATOR: PHYSICAL DAMAGE

Facilities and infrastructure features play a crucial role both during disaster situations and in supporting the overall health and welfare of a community on a day-to-day basis. These include buildings, flood and stormwater systems, potentially hazardous sites, and any structures valued by the community for the services they provide. It is important to assess how these features might be affected by climate-related hazards. Repairing or maintaining these structures can be very costly, especially for those vulnerable to physical damage from disasters or ongoing exposure to climate-related stresses like extreme heat, humidity, or frequent flooding.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

B1. The identification and locations of all facility and infrastructure features serving the municipality.

B2. The locations of priority facility and infrastructure features in relation to:

a. current and projected flood areas;
b. current and projected landslide areas;
c. current and projected wildfire areas;
6. carbonate rock areas; and
d. impervious surfaces.

B3. Amounts, types, identification, and locations of priority facilities and infrastructure that may be damaged by current and projected flooding areas and/or are in areas of high impervious surface.

B4. Amounts, types, identification, and locations of priority facilities and infrastructure that may be damaged by:

a. current and projected high temperatures;
b. current and projected drought conditions;
c. current and projected high wind and hurricane conditions; and
d. current and projected heavy snow and ice conditions.

B5. Amounts and generalized areas of FEMA repetitive loss or severe repetitive loss properties that contain community facilities. (The exact locations or identifiers for these properties are not public information, and would, therefore, not be included in the LUPE. The municipality should, internally identify and track these properties and facilities specifically.)

INDICATOR: OPERATIONAL DAMAGE

Conditions stemming from climate hazards can impact the functional capacity of built infrastructure to operate properly. Operational capacity is critical during and after an emergency event, and it can be an essential component of sustaining day-to-day community functions. Roadways are particularly susceptible, yet they are essential for evacuation during a disaster event, as well as for all sectors of community economy and life on a regular basis. Utilities and stormwater infrastructure are also needed to maintain operational capacity of communities. The ability of facilities and infrastructure to function properly can be impacted by direct exposure or sensitivity to climate hazards, or indirectly by the inability of people to conduct operations due to limited physical access or unanticipated conditions resulting from societal impacts, e.g., COVID-19.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

B6. The identification of and locations of all roads, labeled evacuation routes, and important ingress/egress locations serving the municipality and that currently do or may potentially have operations impacted by:

a. current and projected flood areas;
b. current and projected landslide areas;
c. current and projected wildfire areas;
d. carbonate rock areas;
e. current and projected high temperatures;
f. current and projected drought conditions;
g. current and projected high wind and hurricane conditions;
h. current and projected heavy snow and ice conditions; and
i. disease outbreak, such as a global pandemic.

B7. Amounts, types, identification, and locations of facilities and infrastructure that are experiencing or may experience capacity constraints and performance disruptions or declines due to undersized utilities or storm sewer systems.

Amounts, types, identification, and locations of facilities and infrastructure that may experience capacity constraints and performance disruptions or declines due to disease outbreak, such as was experienced during the COVID-19 pandemic.

FEATURE: HOUSING STOCK & BUSINESSES

Indicators for Climate Vulnerability Analysis of Housing Stock & Businesses

RESIDENTIAL & COMMERCIAL STRUCTURES | PUBLIC & AFFORDABLE HOUSING SITING

LAND USE PLAN CONTEXT

The information gleaned from the CCRHVA about housing and businesses should serve as the baseline for ongoing monitoring of potential damage to these components of the built environment and tracking reduction of built structures in areas of hazard exposure in order to maintain, health and safety all members of the community and to promote economic stability and prosperity for local businesses and communities.

HIGHLANDS REGION PERSPECTIVE

Development patterns of the Highlands Region reflect the unique topography of the area—from industrial settlements that took advantage of iron ore deposits, stream transport, and other features that helped fuel early development in the area, to productive and bucolic agricultural lands and the beautiful scenery that attracted residents to settle in valleys, along streams and mountains, and in woodlands. A changing climate will position some of these areas at a direct and more pronounced risk from increased flooding, landslides, and wildfires—increasing climate hazard vulnerability for built environments and public health and safety. Existing conditions that can make development vulnerable in the Highlands Region, such as the prevalence of carbonate rock that can lead to the formation and collapse of sinkholes, are also worsened by climate change. Furthermore, design standards are being updated for structures to better withstand exposure to climate hazards, and the prevalence of older housing stock and historic downtowns in the Highlands Region means that communities may contain a large number of properties that experience repeated and cumulative substantial damage and are consequently becoming more costly and difficult to maintain.

STATE AND REGIONAL POLICIES AND PLANS

Flood and Stormwater Ordinances and NJ PACT: Municipalities can consider adopting ordinances that go beyond state minimum requirements by including a definition and criteria for minor development to ensure that new or reconstruction of housing and business projects use the latest design flood elevations and rainfall calculations in their site designs.

Electric Vehicle (EV) Supply Equipment Law: Municipalities should enforce the multi-family and parking requirements of the statewide law and consider adoption of an ordinance with additional components, such as lighting, landscaping and other siting criteria.

Hazard Mitigation Planning: Municipalities should track properties repeatedly damaged by natural hazards, and any substantial damage improvements, to integrate this information into their HMP and coordinate mitigation efforts that occur through the HMP process with the CCRHVA and climate adaptation actions pursued by the municipality.

PRO TIP

The EV law enacted an ordinance that applies to every municipality in New Jersey and requires that certain new multi-unit dwellings and parking areas associated with commercial uses provide EV charging spaces and spaces with "make ready" wiring for EV parking spaces to be added in the future. This state law is enforced at the local level, and municipalities can adopt an ordinance, adding other design components if desired. Municipalities need to review new development projects to verify they comply with the law, and they also need to ensure all site design requirements in the ordinance are met, such as for lighting, cord management, screening, and setbacks.

INDICATOR: RESIDENTIAL & COMMERCIAL STRUCTURES

Homes and businesses can incur damage or be destroyed by climate hazards such as flooding, landslides, and wildfires. Structures are vulnerable to damage from moving waters during flash floods, when streams flow over their banks, when water moves laterally underground, due to erosion of stream banks or steep slopes that support structures, or when stormwater in areas of high impervious surface creates flood conditions. Increased precipitation will make landslide occurrence more likely. Being located in areas susceptible to landslides can make a structure vulnerable to damage, as can being located in areas where wildfires may occur or become more prevalent or pronounced due to increased drought and temperatures, which may also increase the likelihood of sinkholes forming or collapsing under existing structures.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

B8. The locations and parcels of residential and commercial structures in relation to:

a. current and projected flood areas;
b. current and projected landslide areas;
c. current and projected wildfire areas;
d. carbonate rock areas; and
e. impervious surfaces.

B9. Amounts and generalized areas of FEMA repetitive loss and severe repetitive loss properties that contain residential and commercial structures. (The exact locations or identifiers for these prop-erties are not public information, and would, therefore, not be included in the LUPE. The municipality, should internally identify and track these properties and facilities specifically.)

B10. Map(s) and table(s) of parcels with any residential or commercial structure that include:

a. the number of flood insurance policies and claims filed relative to current and projected flood areas;
b. structures classified as repetitive loss or severe repetitive loss in the FEMA NFIP program (do not show exact locations);
c. structures not in compliance with design and substantial damage provisions of an adopted municipal code coordinated ordinance;
d. the average year of structures built; and
e. areas where base flood elevation will raise the height of the structure to expose it to current or projected higher wind forces.

INDICATOR: PUBLIC & AFFORDABLE HOUSING SITING

Socially vulnerable populations are disproportionately affected by climate hazards due to their preexisting experiences contending with a deficiency of resources to prepare for or respond to interruptions or disasters caused by hazard exposure or events. Physical and mental health conditions are also compounded or brought on by impacts of climate hazards. Intentional consideration and attention to proactively identify and address current and projected climate impacts for socially vulnerable populations is necessary for the CCRHVA to apply an equitable approach and result in equitable benefits. For this reason, public and affordable housing should be independently evaluated and addressed in the LUPE, although much of the analysis workflow overlaps with evaluation of residential structures. Direct health impacts on socially vulnerable populations, and public health overall, is addressed in the section of this guidance that outlines assessment of the social system.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

B11. The locations and parcels of existing and proposed public and affordable housing in relation to:

a. current and projected flood areas;
b. current and projected landslide areas;
c. current and projected wildfire areas;
d. carbonate rock areas; and
e. impervious surfaces.

B12. Amounts and generalized areas of FEMA repetitive loss and severe repetitive loss properties that contain existing and proposed public and affordable housing units and developments. (The exact locations or identifiers for these properties are not public information, and would, therefore, not be included in the LUPE, however the municipality should internally identify and track these properties and facilities specifically.)

B13. Map(s) and table(s) of parcels with any existing or proposed public or affordable housing structure that include:

a. the number of flood insurance policies and claims filed relative to current and projected flood areas;
b. structures classified as repetitive loss or severe repetitive loss in the FEMA NFIP program (do not show exact locations);
c. structures not in compliance with design and substantial damage provisions of an adopted municipal code coordinated ordinance;
d. the average year of structures built; and
e. areas where base flood elevation will raise the height of the structure to expose it to current or projected higher wind forces.

NATURAL SYSTEM

NATURAL LANDS RESOURCES

Protected Natural Lands & Their Buffers for Migration

Biodiversity & Connectivity

Urban Ecology

WATER SOURCE RESOURCES

Water Quality | Water Quantity

AIR QUALITY

Air Pollution

FEATURE: NATURAL LANDS RESOURCES

Indicators for Climate Vulnerability Analysis of Natural Lands Resources
PROTECTED NATURAL LANDS AND THEIR BUFFERS FOR MIGRATION | BIODIVERSITY AND CONNECTIVITY | URBAN ECOLOGY

LAND USE PLAN CONTEXT

The information gleaned from the CCRHVA of Natural Lands Resources should serve as the baseline for ongoing monitoring of natural lands restoration and preservation goals that reduce vulnerability to climate hazards, provide equitable benefits across the community from services and benefits provided by natural lands resources, and sustain the natural assets of the Highlands Region.

HIGHLANDS REGION PERSPECTIVE

Providing a significant portion of the state's groundwater resources, which are largely replenished by infiltration of precipitation into soils of natural land areas, it is imperative that the Highlands Region maintain and enhance its natural lands in response to and in anticipation of climate change impacts. Natural lands are critical in the Highlands Region to filter and replenish a main source of the state's supply of fresh water. The Highlands Region is rich in natural lands, and there are regulatory and other frameworks that promote the protection and enhancement of these areas. Given the natural geography and resources present in the region, there are many opportunities for land preservation and restoration, and in those efforts, consideration should be given to prioritizing natural lands of high value for maintaining healthy ecosystem function of the region and providing community-wide benefits and that are at risk of damage resulting from climate hazard impacts. Consideration should also be given to lands that may be needed to support natural resources in the future, such as for the migration of floodplains and riparian areas.

STATE AND REGIONAL POLICIES AND PLANS

Environmental Justice (EJ) Law: This law is focused on ensuring that additional harm is not imposed on overburdened communities by the siting of state regulated pollution-generating facilities. Municipalities should ensure that open space or other benefits are equitably located in their community with meaningful opportunities for residents, especially those in overburdened areas, to engage and provide feedback on proposed improvements.

Natural and Working Lands Strategy: Once the land type strategies "forested," "agricultural," and "aquatic habitats" are released, municipalities should integrate the recommendations for land protection, restoration, and management to reduce greenhouse gasses into their open space management plans, land acquisition priorities, and land use ordinances.

Statewide Comprehensive Outdoors Recreation Plan: Outside, Together! is a statewide strategy for outdoor recreation and conservation planning. Municipalities should consult the Plan to connect with statewide strategies, particularly to reduce vulnerabilities of natural lands to climate hazards through measures that enhance ecosystem health and prepare for potential migration of habitats in response to changing environmental conditions.

PRO TIP

EJ communities have experienced disproportionate environmental and public health stressors, as well as a lack or absence of environmental and public health benefits. Introducing natural lands and ecosystem services into these communities can address certain EJ disparities.

INDICATOR: PROTECTED NATURAL LANDS & THEIR BUFFERS FOR MIGRATION

LUPEs of municipal master plans often describe locations and amounts of preserved land in the municipality. While it is important to understand the existing geography of preserved lands throughout the region and within localities, it is just as important to consider the future preservation of natural lands within the context of climate change, which also necessitates a focus on healthy ecosystem function to reduce the impacts of climate change-related hazards.

Natural land preservation strategies are typically contextualized in open space plans. Because the LUPE contains the CCRHVA and sets the overall land development goals for the community, it should also include the existing conditions and priorities for protecting and restoring natural lands. To serve as an effective resource in open space planning and determination of future development patterns, the LUPE of the master plan should, therefore, contain information about all public and private natural lands areas, and which areas are of greater priority in their provision of ecosystem services that may reduce exposure and sensitivity to climate hazards for the resource. This information can then be used to update open space plans so they include recommendations to reduce climate hazard vulnerabilities for natural lands resources.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

N1. The locations of existing public and private natural lands and their buffers for migration:

- within the boundaries of the municipality;
- in the context of surrounding natural lands outside the municipality;
- in relation to current and projected flood areas;
- in relation to current and projected landslide areas; and
- in relation to current and projected wildfire areas.

N2. Identification of natural lands that are priority areas for preservation and restoration in terms of groundwater recharge, old growth forest cover, riparian areas, wildlife corridors, and other locally- and regionally-specific criteria.

N3. The zoning provisions for natural lands that are identified as priority areas for preservation and restoration, including an evaluation of the ramifications of inconsistencies in zoning ordinances and natural lands protection and restoration priorities.

N4. An accounting of the preservation and restoration status of priority natural lands areas in relation to climate hazard vulnerability.

INDICATOR: BIODIVERSITY & CONNECTIVITY

Natural lands provide ecosystem services that are necessary for mitigating climate impacts. Levels of biodiversity and the ability of natural lands areas to provide suitable habitat to sustain populations of native plant and animal species offer an indication of the health and ability of the areas to provide those services. Communities with insufficient or impaired ecosystem services are more vulnerable to the impacts of climate hazards.

While natural resource management plans may contain data and insight into the functioning of certain environments or species populations, the LUPE should also consider this type of information as it outlines goals for future development patterns.

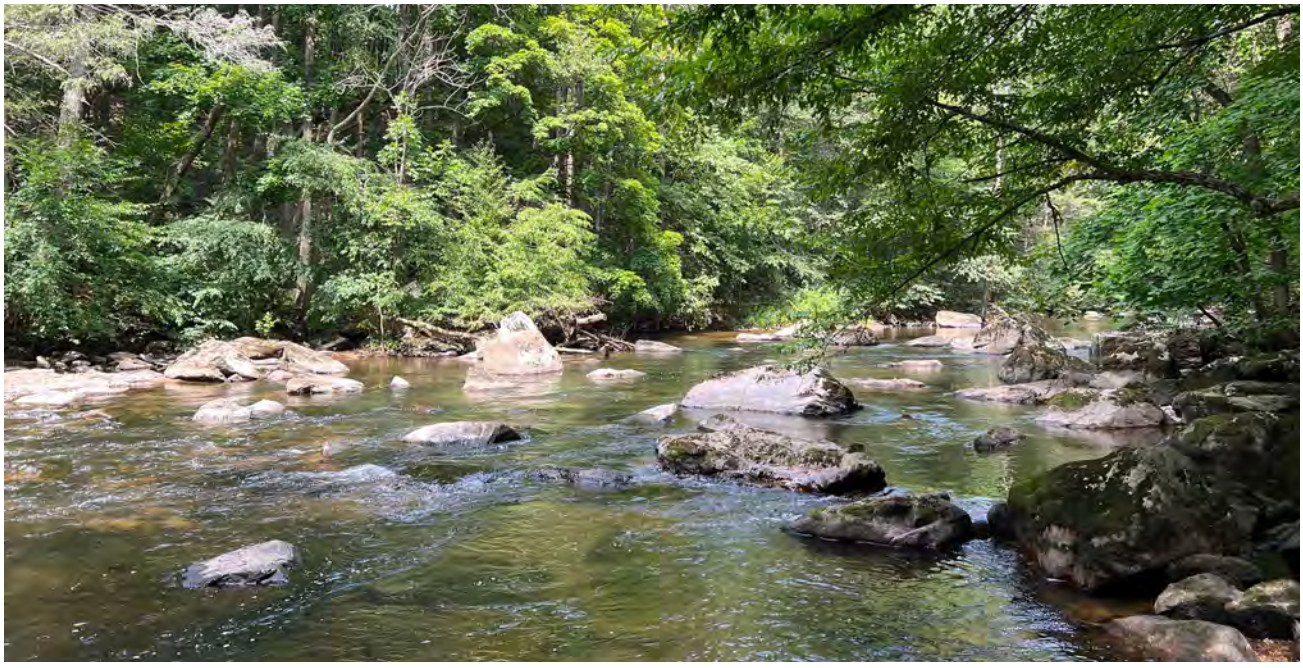
CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

N5. The locations of species habitat and wildlife corridors:

- within the boundaries of the municipality;
- in the context of surrounding natural lands outside the municipality;
- in relation to current and projected flood areas;
- in relation to current and projected landslide areas; and
- in relation to current and projected wildfire areas.

N6. The potential ability of natural lands areas to support biodiversity and maintain ecosystem function. *Note that a more detailed understanding of biodiversity would be obtained through ecological studies and surveys.

N7. Identification of potential preservation efforts and zoning changes to increase and improve species habitat and connectivity among natural lands areas to sustain biodiversity and enable climate migration of plants and animals.



INDICATOR: URBAN ECOLOGY

Urban communities should also contain areas that provide ecosystem services. Natural features in urban environments can directly mitigate the impacts of climate hazards on people living and working there by helping to manage stormwater runoff and providing a cooling effect that helps to counter high temperatures. In built areas, patches of natural lands may exist in places such as along waterways or as infill dispersed throughout the community. A tree canopy also reduces temperatures in urban areas, which is a health impact that is considered in the Social System section.

Assessment, management, and enhancement of natural lands in urban environments necessitates appropriate approaches suitable to mixed-use development and may require techniques different from those employed in less urbanized areas. Although extensive ecological studies may not be available for urban areas, the LUPE should include consideration of the existing and potential natural lands existing in urban communities.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

N8. The location and amount of existing and potential tree canopy in urban areas.

N9. Identification of areas in urban communities suitable for natural lands development and/or additional tree canopy.

FEATURE: WATER SOURCE RESOURCES

Indicators for Climate Vulnerability Analysis of Water Source Resources

WATER QUALITY | WATER QUANTITY

LAND USE PLAN CONTEXT

The information gleaned from the CCRHVA of Water Source Resources should serve as the baseline for ongoing monitoring of water availability and water quality goals that reduce the vulnerability of water resources to climate hazards and maintain the ability of the Highlands Region to provide potable water to New Jerseyans. For example, a municipality should be aware of existing and potential contaminant sources in wellhead protection areas, particularly if the wellhead is in a floodplain or floodprone area.

HIGHLANDS REGION PERSPECTIVE

The Highlands Region contains significant water source resources and provides the water supply for over 5 million New Jerseyans, making assessment and monitoring of water quality and quantity extremely important at both regional and local levels. Local conditions can have major impacts on water source resources, and climate hazards can intensify or exacerbate factors contributing to loss or degradation of the resource. Evaluation of water quality and quantity may be included in local or regional environmental studies and plans aimed at protecting the natural resource. To ensure the same objective is integrated into development planning and municipal decision-making, information describing the conditions and vulnerabilities of the region's water resources needs to be a central component of municipal LUPEs.

PRO TIP

The model Water Use and Conservation Management Plan for a community's watershed can be used to develop appropriate water supply conservation requirements at the municipal level.

STATE AND REGIONAL POLICIES AND PLANS

Flood and Stormwater Ordinances and NJ PACT: Municipalities need to ensure they have adopted the minimum state standards in local ordinances and, in some cases, may want to enforce additional standards that reduce flooding impacts on water quality and quantity.

Statewide Comprehensive Outdoors Recreation Plan: Outside, Together! municipalities should consult the statewide strategy for outdoor recreation and conservation planning to identify for opportunities to collaborate with the state to protect riparian areas and other natural lands important for reducing climate hazard impacts on water quality and water supply.

PRO TIP

Municipalities need to update their Flood Control Ordinances to comply with the National Flood Insurance Program. This is a good opportunity to also establish methods for tracking substantial damage to properties and enforcing restrictions on structural and non-structural development in the floodplain.

INDICATOR: WATER QUALITY

Contamination of freshwater natural resources can occur from specific, identifiable locations and from non-specified areas. Because aquifers underlie much of the Highlands Region, the conditions and activities at essentially any location in the region have the potential to contaminate a water source resource. **Contaminants** include chemical or biological materials. Examples include pesticides and fertilizers used in agricultural or landscaping applications entering surface water or groundwater, silt and sedimentation from erosion of soils or landslides along slopes, and salt entering waterways from runoff of stormwater over salted roadways or, in coastal areas, from below-ground saltwater intrusion. Because contaminants are carried in stormwater runoff, impervious surfaces increase the poten-tial for contamination, as does any flood event. Droughts and high temperatures can also create environmental conditions that increase vulnerability to contaminants from soil erosion and biological agents, such as harmful algal blooms (HABs).

Aside from providing potable water, water source resources also serve as recreation destinations and are in proximity to residential developments for many Highlands municipalities. Understanding the economic and health impacts associated with water quality is an important component of land use planning, and efforts to minimize contamination of water source resources should be central to the LUPE in municipal master plans.

PRO TIP

Municipalities should be aware of existing and potential contaminant sources in wellhead protection areas, particularly if the wellhead is in a floodplain or floodprone area.

CCRHVA Output: What to Include in the Land Use Plan Description of Existing Conditions

N10. The locations of existing water source resources:

- within the boundaries of the municipality;
- in the context of the watershed;
- in relation to impervious surfaces;
- in relation to current and projected flood areas;
- in relation to current and projected landslide areas; and
- in relation to potential sources of water pollution contaminants.

N11. Amounts of impervious surfaces:

- within the municipality;
- in the context of the watershed;
- in relation to wellheads; and
- in relation to carbonate rock areas.

N12. Identification of potential sources of water source resource contamination. (There may be subsequent analyses in the CCRHVA, such as of farmland, that may contribute data to this analysis.)

N13. Water quality testing for contaminant levels and aquatic species habitat.

INDICATOR: WATER QUANTITY

Fresh water is a limited resource, and the amount of water available for human use is related to how clean the water source resources are and the extent to which sources of fresh water are replenished through the water cycle. Precipitation adds water directly to surface water sources and to groundwater after infiltration into the soil. Communities in the Highlands Region primarily rely on groundwater for their potable water,[18] making infiltration of precipitation where it falls an important strategy for maintaining water quantity for homes and businesses within the region.

Reducing the area over which precipitation travels over land before it reaches a water source not only reduces the potential for contamination of water source resources but also more swiftly adds to the amount of potable water available. Development patterns and amounts of impervious surface directly affect replenishment of water source resources and should, therefore, be included in municipal LUPEs as an important factor in determining where and to what extent local development occurs.

As will be addressed in the Built System section, replenishing groundwater helps to maintain higher water table levels to provide stability to the ground surface, which reduces vulnerability to sinkhole formations that form in the Highlands Region due to the presence of carbonate rock that may contain karst features.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

N14. Fresh water availability.

N15. Water source resources that may be more vulnerable to depletion from current and projected high temperature and drought conditions (i.e. unvegetated stream corridors and lake coasts).

N16. Amounts and locations where groundwater recharge areas are covered by impervious surfaces.

N17. Amounts, types, and locations where development of impervious surface is permitted or planned in prime groundwater recharge areas.

FEATURE: AIR QUALITY

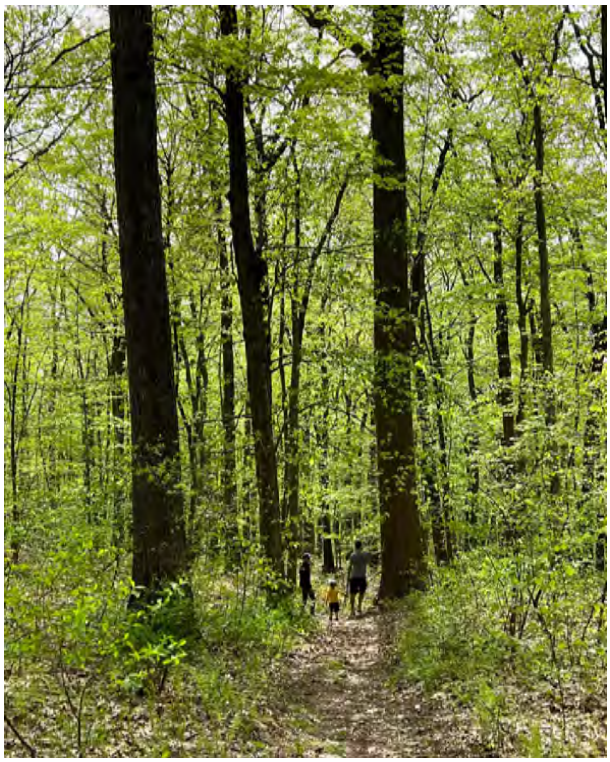
Indicator for Climate Vulnerability Analysis of Air Quality | **AIR POLLUTION**

LAND USE PLAN CONTEXT

The information gleaned from the CCRHVA about air quality should serve as the baseline for ongoing monitoring of air pollutant levels and tracking reduced air quality from climate hazard impacts.

HIGHLANDS REGION PERSPECTIVE

Air quality can be compromised from natural- or human-induced causes. In much of the Highlands Region, which has lower population density and an abundance of forested area, climate change is more likely to affect air quality by intensifying natural mechanisms, such as wildfires, plant allergens, and airborne mold or fungi, particularly in response to flood or wetter weather conditions. Despite the region's relatively high amount of natural areas, people may still be exposed to poor air quality conditions, whether they are in urban or rural areas.



STATE AND REGIONAL POLICIES AND PLANS

New Jersey Energy Master Plan (NJEMP): Municipalities that choose to undertake and implement a Community Energy Plan,[19] which uses the framework of the NJEMP and is supported by resources from the Board of Public Utilities, can reduce local greenhouse gas emissions and thereby improve air quality.

Electric Vehicle (EV) Supply Equipment Law: Municipalities should adopt an ordinance to ensure that new developments comply with the law to facilitate EV use. Municipalities should consider adopting additional components that promote EV use for all.

Natural and Working Lands Strategy: Once the strategies for all land types are released, municipalities should consider the applicability to lands they own and manage to identify strategies to reduce greenhouse gases.

PRO TIP

The Sustainable Jersey Guide for Sustainable Energy Communities and the accompanying Community Energy Plan Workplan Template highlight opportunities for municipalities to generate the highest emissions reductions and offer guidance to utilize such opportunities.

INDICATOR: AIR POLLUTION

Air quality can be impacted by climate change due to hazards that create or exacerbate airborne chemical and biological components that impact human health. Increasing temperatures raise levels of smog in urbanized areas and can increase plant pollens and allergens as a result of longer and more productive growing seasons. Drought conditions can add particulates to the air when soil is susceptible to wind erosion. Wildfires can abruptly release large amounts of pollutants that can be carried across large distances. Flooding can create conditions that promote mold growth, and consequently an increase in allergen spores. With its remarkable open spaces and lack of intense urbanization, air quality in the Highlands Region may not be as impacted compared to the rest of the state. However, air contaminants travel into the NJ Highlands Region from across state boundaries, and, considering the potential impacts and uncertainties associated with changing temperature and precipitation, establishing a baseline from which to monitor for increases in air pollution will help assess whether a community is vulnerable.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

N18. Areas where air quality may be degraded due to increased exposure to current and projected flood and wildfire hazards.

N19. Areas where air quality may be degraded due to high or increasing concentrations of air pollutants, such as particulate matter and ozone.

SOCIAL SYSTEM

PEOPLE

Public Health

Vulnerable Populations

FEATURE: PEOPLE

Indicators for Climate Vulnerability Analysis of People

PUBLIC HEALTH | VULNERABLE POPULATIONS

LAND USE PLAN CONTEXT

The information gleaned from the CCRHVA about community demographics and the exposure and sensitivity of people to climate hazards should serve as the baseline for ongoing monitoring of public health, equity, and safety as a means of tracking the progress of land use goals that improve quality of life for everyone in the community, adequately support vulnerable populations, and advance equity and climate adaptation solutions—all of which would reduce vulnerability to climate hazards.

HIGHLANDS REGION PERSPECTIVE

The Highlands Region is home to more than 2.6 million people and welcomes many visitors from across the state and beyond. As people live, work, and explore in the Highlands Region, climate hazards such as extreme heat and severe storms will impact their personal experiences and potentially their safety and well-being. People experiencing social vulnerability face even greater exposure and sensitivity to climate hazard impacts. The cultural and economic assets of the region are of value because people are able to acknowledge, access, and appreciate them. Impacts of climate change have the potential to degrade people's ability to enjoy and support these assets, especially if their own lives and property are at risk. Effective public communication and engagement, with specific focus on vulnerable populations, will help sustain the vitality of the Highlands Region into the future.

STATE AND REGIONAL POLICIES AND PLANS

Environmental Justice (EJ) Law: Municipalities have a role in ensuring that the law is being used to evaluate state regulatory permits for pollution-generation facilities that are proposed in or near their communities. **Municipalities can provide a forum** and play a role in facilitating meaningful opportunities for residents in overburdened communities to engage with and provide feedback on proposed projects that would exacerbate environmental or public health.

Hazard Mitigation Planning: Municipalities should participate in the HMP process to prioritize mitigation efforts and adaptation strategies to reduce climate hazard vulnerability resulting in public health concerns and impact to vulnerable populations. Municipalities should ensure the public is aware of and educated about natural hazards and the HMP process, with specific focus on engaging socially vulnerable populations in meaningful ways.

PRO TIP

Use the community engagement resource in the appendix to guide inclusive outreach and decision-making. "Meaningful involvement" means that people's contributions can influence municipal decisions and decision makers will seek out and facilitate the involvement of those potentially affected.

INDICATOR: PUBLIC HEALTH

The health and safety of everyone is affected in various ways by the multiplicity of impacts resulting from major changes to local environmental conditions. Climate hazards expose people to public health concerns such as extreme heat, flooding, pathogens, poor air quality, physical or psychological trauma, and consequential disruptions to work and family life. To ensure the general welfare and safety of people in the community, municipalities need to pay attention to locations in the municipality where the presence of climate hazards increases vulnerability for people, and what people need in order to reduce their exposure and sensitivity to both natural hazard events and longer-term or chronic exposure to climate hazards.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

S1. The locations of and parcels within census blocks in relation to:

- current and projected flood areas;
- current and projected landslide areas;
- current and projected wildfire areas; and
- carbonate rock areas.

S2. The percent of the town's population and a demographic profile of the population living in areas that intersect with current and projected flood, landslide, wildfire, and carbonate rock areas (or census blocks associated with these areas) and projected population changes for these areas.

S3. The locations and descriptions of evacuation centers, heating/cooling/charging centers, and healthcare/wellness/food/financial supports and resources that serve the public during natural hazard events, including:

- their locations relative to current and projected flood, landslide, wildfire, and carbonate rock areas;
- roadways to access the supports and resources that are impacted by these areas;
- mobility/transportation resources, barriers, and patterns associated with all members of the community accessing resources in or near these areas during a natural hazard event. Consideration can also be given to the extent these resources are available to reduce overall vulnerability of the population when the community is not experiencing a natural hazard event; and
- an evaluation of public access to supports and resources provided during a natural hazard event (and in relation to community need not during an event, if relevant), and how that access may be impacted by flood, landslide, wildfire, and carbonate rock hazard areas and hazards that are non-spatially-defined but may interfere with access, including high temperatures, severe weather, and disease outbreak. Consider roadways impacted and mobility/transportation resources, barriers, and patterns.

S4. A tabulation of the overall condition/modernization of residential and commercial structures that includes the average year the structures were built and consideration of the contribution of these structures to climate hazard impacts on public health (e.g. no air conditioning).

S5. A heat island analysis (i.e. areas of extreme temperature) that includes:

- map(s) of the locations of current and projected heat islands within the municipality;
- the percent of the total municipal population and a demographic profile for people living (and working, if relevant) in heat island areas, and projected population changes for these areas. (Specific evaluation of people experiencing social vulnerability in relation to heat islands is described in the next section.); and
- the relationship between heat islands and the condition/modernization of the housing stock.

INDICATOR: VULNERABLE POPULATIONS

Socially vulnerable populations are groups of people experiencing socially driven or perceived characteristics—such as socioeconomic status, age, gender, race and ethnicity, English language proficiency, and disability—that may increase the likelihood of exposure or sensitivity to a climate hazard. This includes populations underserved due to environmental injustices, and other low-income and minority populations that have experienced historic under- or disinvestment and are disproportionately burdened by or less able to prevent, respond to, and recover from adverse environmental impacts. Because of the potential for planning activities and adaptation strategies to exacerbate existing disparities in exposure and sensitivity, it is important to intentionally and specifically evaluate relationships between vulnerable populations, climate hazards, and equitable solutions to proportionally reduce the exposure and sensitivity of vulnerable populations to the impacts of climate hazards.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

S6. The locations of socially vulnerable populations, including communities designated as overburdened and those designated as environmental justice communities, in relation to:

- current and projected flood areas;
- current and projected landslide areas;
- current and projected wildfire areas;
- carbonate rock areas; and
- current and projected heat island areas.

S7. A description of the social determinants of health that affect the community, including the community's municipal revitalization index.

S8. A demographic profile of socially vulnerable populations in the municipality and description of how the specific populations of the community may be impacted by current and projected flood, landslide, wildfire, carbonate rock, and heat island areas (or census blocks associated with these areas), and projected population changes in socially vulnerable populations for these areas.

S9. The locations and descriptions of the overall condition/modernization of public and affordable housing structures that includes the average year the structures were built and consideration of the contribution of these structures to health impacts for socially vulnerable populations (e.g. no air conditioning).

ECONOMIC SYSTEM

SUSTAINABLE ECONOMIC DEVELOPMENT

Jobs

Non-Residential Tax Base

WORKING LANDS

Farming

OUTDOOR RECREATION

Eco-Tourism | Agri-Tourism

FEATURE: SUSTAINABLE ECONOMIC DEVELOPMENT

Indicators for Climate Vulnerability Analysis of Sustainable Economic Development

JOBS | NON-RESIDENTIAL TAX BASE

The information gleaned from the CCRHVA about the local economy should serve as the baseline for ongoing monitoring of economic vitality of the municipality as a means of tracking reduced vulnerability of livelihoods, businesses, and municipal commercial centers to climate hazards.

LAND USE PLAN CONTEXT

The Highlands Planning Areas designated by the RMP, while not necessarily meant to be delineations of growth centers, are intended to guide development away from water resources and environmentally sensitive areas and concentrate development sustainably around existing transportation and other infrastructure. Sustainable economic development favors smart growth principles—compact, walkable town centers that have access to public transportation and contain a diversity of commercial businesses and a mix of residential and commercial land uses. To ensure that municipalities in the Highlands Region make informed investments in fostering sustainable economic development that promotes economic stability for their communities and the region, they need an understanding of the locations where any climate hazards are currently and are projected to occur, and the impacts all climate hazards have on local economic activity, which can be assess, through an evaluation of access to jobs.

PRO TIP

The Highlands Council provides resources to help municipalities to implement the smart growth goals of the RMP.

HIGHLANDS REGION PERSPECTIVE

Protection of water resources is the primary objective of the land-use structure guiding development in the Highlands Region. Conservation of the natural resources and environmental integrity of the region supports this objective. At the same time, there is a need and desire to ensure economic vitality for Highlands communities and the region as a whole. The regional economy and local economies must balance environmental sustainability and economic development, making sustainable economic de-velopment an important part of sustainability and climate adaptation planning.

STATE AND REGIONAL POLICIES AND PLANS

Flood and Stormwater Ordinances and NJ PACT: Municipalities should strictly interpret and implement the stormwater ordinance in their development application approvals to maximally infiltrate rainwater where it falls, and consider going beyond the state minimum requirements by adding redevelopment and rehabilitation to the ordinance definitions and clarifying how to calculate stormwater on a previously developed site to ensure that all development and redevelopment projects in urban areas are reducing impervious surfaces.

Natural and Working Lands Strategy: Once the strategies for "developed" land types are released, municipalities should consider the applicability to their downtown planning and how developed municipal properties can be managed to reduce greenhouse gases.

INDICATOR: JOBS

The vulnerability of the business community is affected by the impacts that climate hazards can have on employment, particularly in cases when impacts extend throughout the community. The number and stability of jobs can be highly affected by the ability of people to arrive at and fulfill their jobs—for example, such as when there is a power failure, air quality is poor from a wildfire, or roads are flooded from an intense rain event. Municipal efforts to support the business community rely on an understanding of the number of jobs that may be impacted by widespread climate hazards and the extent to which the municipality serves as a job center, which can also have implications for the economic vulnerability of the Highlands Region. Specific areas where jobs are concentrated, such as town centers or industry cluster areas, should be considered within that context when evaluating vulnerabilities related to climate hazards.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

E1. The number of jobs in the municipality and the number of jobs per employed resident.

E2. A description of how the number and stability of jobs in the municipality may be affected by:

- current and projected occurrence of flooding;
- current and projected occurrence of wildfires;
- current and projected occurrence of severe storms; and
- potential occurrence of disease outbreaks, such as occurred during the COVID-19 pandemic.

INDICATOR: NON-RESIDENTIAL TAX BASE

In an assessment of vulnerability, municipalities need to consider incoming revenue, and one of the main ways that climate change can impact municipal revenue is by reducing property values and taxes generated from commercial properties. Climate hazards can reduce the non-residential tax base when a high number or significant commercial properties are in areas exposed to climate hazards. Knowing the spatial distribution of this vulnerability can inform climate adaptation strategies to support the local economy and municipal tax base, and make efficient use of municipal budgets to address climate hazards.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

E3. The locations of the non-residential parcels that intersect with:

- a. current and projected flood areas;
- b. current and projected landslide areas;
- c. current and projected wildfire areas; and
- d. carbonate rock areas.

E4. A description of the individual assessed values and the total proportion of municipal tax revenue represented by non-residential parcels within each hazard area.

FEATURE: WORKING LANDS

Indicators for Climate Vulnerability Analysis of Sustainable Economic Development

JOBS | NON-RESIDENTIAL TAX BASE

The information gleaned from the CCRHVA about lands used for crop and livestock production and forestry should serve as both the baseline for ongoing monitoring of how economies associated with these lands may be impacted by climate hazards, and the baseline to track reduction of the vulnerability of livelihoods and businesses dependent on these working lands. If applicable to a particular municipality, additional consideration should be given to working waters such as fisheries and aquaculture.

LAND USE PLAN CONTEXT

Development pressure, such as to create more housing or expand industries manufacturing and warehousing, can threaten economies that depend on land for farming of crops, animals, and forest products. The high value of land also creates an incentive for landowners to sell existing farmland for a change in use. Adopting appropriate zoning and land use ordinances based on master plans that prioritize farmland for preservation is a means for municipalities to determine development patterns. Evaluating the vulnerabilities of farmland to the uncertainties of climate patterns that directly affect the environmental conditions that these lands depend on for productivity will also help guide land use planning to sustain and optimize these lands. In addition to assessing vulnerability of working lands in the LUPE, municipalities with a Farmland Preservation Plan should ensure that the results of the CCRHVA are incorporated into that plan.

HIGHLANDS REGION PERSPECTIVE

Over 15,000 acres of unconstrained farmland in the Highlands Region are at risk of development.[20] The region has understandably focused attention on preserving farmland due to development pressures. Analyzing farmland in the CCRHVA will determine the extent that farmland in the region is at risk from climate hazards. There are approximately 288,000 acres of farmland in the Highlands Region,[21] all of which will be impacted by the changing climate. All farms are impacted by changes to growing seasons, fewer cold days, extreme heat and weather events, wildfire smoke, pest invasions, and increasingly dangerous outdoor working conditions, which are all factors that are already experienced or are anticipated due to climate change. Furthermore, smaller farms prevail in Highlands Region counties, and most of the counties in the region are experiencing decreasing market value of products.[22] To retain a successful farming sector throughout the region, municipalities will need to collectively incorporate climate hazard impacts into their farmland land preservation plans.

STATE AND REGIONAL POLICIES AND PLANS

Natural and Working Lands Strategy: Once the "agricultural" land type strategy is released, municipalities should integrate the recommendations on land protection and management to reduce greenhouse gasses into their farmland plans and programs.

PRO TIP

Healthy agricultural soils can be effective carbon sinks, drawing greenhouse gases out of the atmosphere and into soil ecosystems.

INDICATOR: FARMING

With its reliance on natural inputs and variable markets, farming could be considered an inherently risky business. Adding to the expected uncertainties, impacts from climate hazards can have a profound effect on the viability of individual farms, farming communities, and local and regional farm economies because the hazards have the potential to cause devastating loss to productivity. Crops, animals, and equipment can be damaged or destroyed by flooding, extreme weather, extreme temperature, erosion due to intense precipitation (including mudslides/landslides), drought conditions, wildfires, and pests and diseases—all of which are climate hazards affecting municipalities in the Highlands Region. The ability to provide support to farmers rests on an understanding of their vulnerabilities to climate change impacts.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

E5. The locations and descriptions of farmland in relation to:

- a. current and projected flood areas;
- b. current and projected mudslide/landslide areas;
- c. current and projected wildfire areas;
- d. prime farmland areas; and
- e. municipal zoning.

E6. The locations and descriptions of parcels with farmland and/or operating farms that are in areas zoned for uses other than farming.

E7. Information about the extent that farming is organic compared to conventional, including the proportion and locations of organic versus conventional farms, and considering how farm management strategies related to reliance on chemical applications may be impacted by climate change. (This information may also be applicable to the analysis of water quality in the CCRHVA).

E8. Information about farming revenues, crop insurance policies and payments, and crop losses and how they may be impacted by:

- a. current and projected flooding;
- b. current and projected mudslides/landslides;
- c. current and projected wildfires;
- d. current and projected high temperatures;
- e. current and projected drought conditions;
- f. current and projected severe weather, such as high winds, hurricanes, and heavy snow and ice; and
- g. current and projected agricultural pests and diseases.

FEATURE: OUTDOOR RECREATION

Indicators for Climate Vulnerability Analysis of Outdoor Recreation

ECO-TOURISM | AGRI-TOURISM

The information gleaned from the CCRHVA about outdoor recreation should serve as both the baseline for ongoing monitoring of how economies associated with eco-tourism and agri-tourism may be impacted by climate hazards, and the baseline to track reduction of vulnerability of livelihoods and businesses that rely on outdoor tourism and recreation. Additional consideration may be given to how public access to recreation opportunities may be affected by climate hazards. There is a relationship between recreation and public health, which is analyzed in the CCRHVA as part of the Social System.

LAND USE PLAN CONTEXT

Outdoor recreation is associated with local economies in areas with abundant natural resources and agricultural assets. The areas associated with outdoor recreation also contribute to the identity and cultural assets of a place. In their land use planning activities, municipalities should consider how increasing exposure to climate hazards may impact the ability of these areas to continue providing recreational services. For municipalities looking to grow their tourism sector in their economic development planning, an understanding of the vulnerability of local eco-tourism and agri-tourism to climate hazards is essential.

HIGHLANDS REGION PERSPECTIVE

Eco-tourism and agri-tourism are developing as "key opportunities" in the tourism market, and the demand for outdoor recreation is trending upward.[23] The Highlands Region contains considerable opportunities for outdoor recreation, including skiing, hiking, fishing, and visiting cultural and historical sites.

The various types of crop and animal farms in the region add substantial agri-tourism opportunities to the suite of outdoor recreation offerings. Additionally, activities like running and cycling against the backdrop of the scenery of the Highlands can be a major draw for many recreationists. Fostering a strong outdoor recreation economy is an ideal strategy for balancing natural resource protection with economic development in the Highlands Region.

STATE AND REGIONAL POLICIES AND PLANS

Statewide Comprehensive Outdoors Recreation Plan: Outside, Together! municipalities should consult the Planto identify opportunities to connect with statewide strategies that identify chances to expand outdoor recreation and work with stakeholders to integrate climate adaptation into the design and management of outdoor recreation facilities and natural resources.

Natural and Working Lands Strategy: Once the "forested," "agricultural," and "aquatic habitats" land type strategies are released, municipalities should integrate the recommendations into local strategies that promote outdoor recreation.

INDICATOR: ECO-TOURISM

A successful eco-tourism industry depends on having quality outdoor destinations and people being able to enjoy the destinations. Climate hazards can impact both of these by decreasing the recreational services outdoor areas can provide by degrading forests around nature trails or decreasing snow pack on ski slopes, for example, and by making con-ditions unsuitable or unwelcome for visitors, such as under conditions of extreme heat, drought, or intense rainfall. There are many factors that affect the tourism industry, and it is important to include information about impacts of climate hazards when advancing efforts to support local tourism.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

E9. The number of visitors to natural area outdoor sites, including trends such as the time of year of visits, duration of visits, demographics of visitors, and other relevant variables.

E10. Information and trends about natural area outdoor recreation revenues.

E11. The percent contribution of eco-tourism to the local economy.

E12. Occurrences and trends of use-advisories and closures for natural area outdoor open space sites.

E13. The number of jobs and potential loss in income associated with natural area outdoor open space recreation.

E14. A description of how public access to, use of, and revenues from outdoor natural area recreation destinations may be impacted by:

a. current and projected flooding;
b. current and projected high temperatures;
c. current and projected drought conditions;
d. current and projected severe weather, such as high winds, hurricanes, heavy snow and ice; and reduced cold days and snow pack;
e. current and projected ecological pests and diseases; and
f. changes in biodiversity and other ecological variables.

INDICATOR: AGRI-TOURISM

Agri-tourism provides farms with access to the tourism market, either as a main source of revenue or to supplement revenues from crop sales. Having this option may be critical to the success or failure of some farms and can also affect the local economy if agri-tourism is a main attraction that brings non-resident visitors to the area. In many cases, the agri-tourism industry is highly dependent on crop production, such as for pick-your-own farms. In addition to impacting crops directly, climate hazards can negatively affect agri-tourism facilities and access to them. Information from the CCRHVA can help facility and farm managers to plan for potential impacts and municipalities to provide support to agri-tourism businesses in the community. Because agri-tourism can involve intense use of the land, activities that degrade soils, such as parking, and increased stormwater runoff, economic development of the industry should incorporate best management practices and climate hazard vulnerabilities of natural resources.

CCRHVA Output:
What to Include in the Land Use Plan Description of Existing Conditions

E15. The number of visitors to agri-tourism destinations, including trends such as the time of year of visits, duration of visits, demographics of visitors, and other relevant variables.

E16. Information and trends about agri-tourism revenues.

E17. The percent contribution of agri-tourism to the local economy.

E18. The number of jobs and potential loss in income associated with agri-tourism.

E19. A description of how public access to, use of, and revenues from agri-tourism destinations may be impacted by:

a. current and projected flooding;
b. current and projected high temperatures;
c. current and projected drought conditions;
d. current and projected severe weather, such as high winds, hurricanes, heavy snow and ice; and reduced cold days and snow pack; and
e. current and projected agricultural pests and diseases.

GOVERNANCE SYSTEM

LOCAL GOVERNANCE refers to the ways in which decisions get made, who is involved in the decision-making, and what the decisions are based on. For climate adaptation, local governance is a major determinant of the municipality's adaptive capacity, which involves institutionalizing and operationalizing the polices, rules, and procedures that are necessary to reduce vulnerabilities to climate hazards. Among municipalities, there is considerable variation in characteristics relating to population, size, environment, degree of urbanization, government capacity, and organizational structure. Highly urbanized cities, for example, do not nec-essarily have the same priorities and decision-making structures as rural towns. Because of this variability, it is important to consider the type of community when assessing and formulating governance strategies, even when the overarching goal of equitable and sustainable adaptation to climate change may be the same across municipalities.

LAND USE PLAN CONTEXT

Local governance factors into climate adaptation through climate change-related regulations, studies, plans, programs, budgeting, and accountability. Incorporating an assessment of local governance into the CCRHVA is a means for municipalities to evaluate their level of adaptive capacity, and the planning goals found in the master plan and other plans often involve actions that improve local governance and adaptive capacity. With the CCRHVA, climate adaptation can now specifically be incorporated into these goals. Appropriate and explicit policy statements in the master plan can ensure that sustainability and climate adaptation are central to the ongoing visioning and long-term outcomes for the municipality. The LUPE template provided with this guidance includes example master plan policy statements.

HIGHLANDS REGION PERSPECTIVE

In the Highlands Region, municipalities benefit from the regulatory framework provided by the RMP because land-use planning and regulation is one of the main ways local governments can interface with climate change,[24] particularly to decrease vulnerability from development in high-risk areas. The planning goals of the RMP to conserve water and protect natural resources have considerable overlap with strategies for municipalities to adapt to climate hazards. In addition to the municipal governance assessment described in the Model CCRHVA, municipalities in the Highlands Region should evaluate their use of the RMP framework, and its supporting resources and funding mechanisms, to advance their adaptive capacity, thereby reducing their climate hazard vulnerability.

STATE AND REGIONAL POLICIES AND PLANS

To take advantage of the benefits state agencies provide for local governments that complete the State Plan Endorsement process, municipalities should refer to the 2020 updated guidelines for the process. In addition to requiring an increased focus on environmental justice and social equity, the guidelines also outline how municipalities need to incorporate climate change considerations as a "mandatory requirement for State endorsement of local government development and redevelopment plans." The purpose of the Highlands Plan Conformance process, which Highlands communities can also use to demonstrate State Plan Endorsement, is to align land uses and capital investment to areas that are suitable and capable to accommodate growth and development, as a means to protect the abundant natural resources of the Highlands Region. To further ensure protection of the critical water supply provided by the region, municipalities in the Highlands can evaluate their proposed land uses in relation to water capacity by preparing a Water Use and Conservation Management Plan, with potential financial support to do so from the Highlands Council.

An evaluation of how the municipality organizes and conducts itself will provide information to adapt through regional coordination, land use ordinances, studies, programs, code enforcement, staffing, budget and funding. The analysis of adaptive capacity in the CCRHVA can identify climate-ready strengths and highlight opportunities for improvement.

The next section outlining goals and strategies for land use in Highlands municipalities offers key ways for municipalities to enhance local governance and increase adaptive capacity through land use and environmental sustainability strategies. The outputs of the CCRHVA contribute to the identification of strategies to improve municipal governance. Regardless of the type of municipality, equitable land use and robust community engagement are critical components of good local governance. Integrating climate readiness and sustainability throughout the master plan and with other planning efforts is also critical to long-term resilience.

STEP 5

ADOPT CLIMATE-READY GOALS

OUTCOMES:

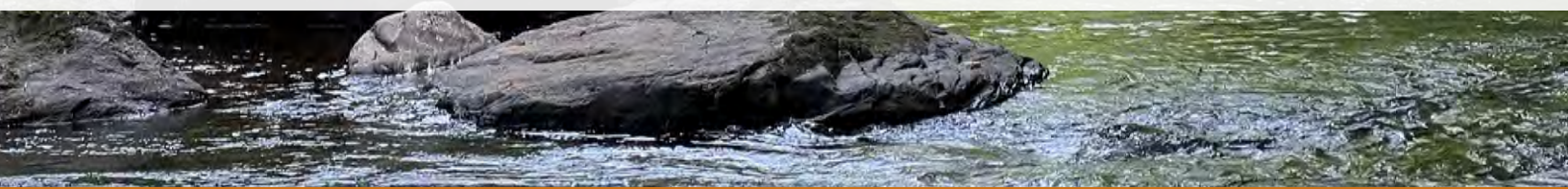
- Integrated planning goals supporting co-benefits toward climate resilience, sustainability, and building community capacity.
- Systematic approach to addressing identified climate hazard vulnerabilities.

HIGHLANDS REGION PERSPECTIVE:

As municipalities update their master plans, the outputs of the CCRHVA will inform the scope of changes that need to be made to planning goals. As per the MLUL, the LUPE must "provide strategies and design standards that may be implemented to reduce or avoid risks associated with natural hazards." Municipalities that have additional elements in their master plans—such as a housing element, circulation element, or any of the other fourteen discretionary elements—will need to ensure their consistency with the CCRHVA and the strategies and design standards identified in response to climate hazards that will be outlined in the LUPE. In addition to implementing planning goals, municipalities can provide support to landowners, farmers, and businesses by way of education, guidance, programs, and connecting to resources provided by the Highlands Council's RMP program. Identifying goals and strategies based on the outputs of its CCRHVA will make a municipality climate ready to address the environmental changes expected for the Highlands Region, meet the needs of the region's population, and protect the natural resources supporting the needs of millions of New Jersey residents outside the region. These goals and strategies should be fully integrated into the municipal master plan and align with the RMP.

TAKE ACTION:

➔ Use the Climate-Ready Strategies resource provided with this guidance while working through Phase 5 of the Model CCRHVA to identify goals and strategies for addressing sustainability and climate hazard impacts for features in the built, natural, social, economic, and governance systems.



HOW TO APPROACH ADOPTING CLIMATE-READY GOALS

CREATE STRATEGIES FOR CLIMATE-READY GOALS

This guidance identifies seven general categories of implementation goals for addressing climate change in planning at the local and regional levels, and relies on five of them for land use planning to address current and future impacts of climate hazards—regulation of land use, restoration and protection of natural features, reinforcement of built infrastructure, relocation of development, and building the adaptive capacity of the community. While the other two goal categories—response preparedness for natural hazard events and reduction of greenhouse gas emission to reduce climate change—are important for climate planning, they are not necessarily related directly to a CCRHVA as it pertains to land use in the case of the former, and climate hazards in the case of the latter.

The climate-ready goals and objectives provided on the following pages are organized by system to correlate with the outputs of the CCRHVA. **Strategies to reduce vulnerabilities for each system feature are provided in the CCRHVA Assessment and Strategy Tools section of this guidance.** All of the strategies and actions provided in this guidance are beneficial for sustaining communities and natural resources in the Highlands Region, and they should be implemented to the extent possible; this guidance suggests a framework for prioritizing them in the context of climate adaptation. In general, outputs that result from the CCRHVA that are derived from spatially-defined hazards, such as flooding or wildfires, will need to be addressed in strategies that relate specifically to the LUPE, primarily in terms of where development occurs. Outputs from the CCRHVA derived from non-spatially defined hazards, such as severe weather, will likely be more suited to inform strategies that are related to adopting ordinances or design standards.

Climate Adaptation Planning Implementation Goals

REGULATE Land Use to ensure development occurs in low-risk areas and in a manner that seeks to conserve natural resources, and to ensure that new development is designed and constructed to mitigate damage from climate hazards.

RESTORE and protect Natural Features to support the wellbeing of all community members and provide ecosystem services.

REINFORCE Built Infrastructure to reduce damage from climate hazards in a manner that maintains public safety, improves utilities, and does not conflict with providing ecosystem services.

RELOCATE out of Hazard Areas to prioritize the safety of emergency response personnel and the public, and to safeguard future investments in infrastructure.

READY the Community to be resilient by enhancing municipal capacity and engaging the public.

RESPOND to Natural Hazard Events through coordinated public services[25] to improve public safety.

REDUCE Greenhouse Gas Emissions in the design of communities and up-grades to the built environment to ad-dress the root causes of global heating.

Not all strategies are applicable to all municipalities, and communities can determine which strategies are most appropriate to reduce their vulnerabilities to climate hazards. **Highlands municipalities are encouraged to pursue the development, adoption, and implementation of resource management planning and protection programs associated with RMP Plan Conformance** and utilize the Highlands Council materials to support resource management planning.

PRO TIPS

The Climate-Ready Strategies in the CCRHVA Assessment and Strategy Tools section are paired with correlating CCRHVA Outputs from Step 4 and Climate Adaptation Planning Implementation Goals from this step.

The Climate Adaptation Action Plan Template in the Resources section can help organize and monitor implementation actions. Step 6 includes guidance for action planning that increases adaptive capacity.

GOALS FOR A RESILIENT **BUILT SYSTEM**

- ☑ Comprehensively and intentionally incorporate climate adaptation into all municipal plans and regulations involving development of and improvements to facilities, infrastructure, homes, and businesses.

- ☑ Increase the municipality's capacity to avoid harm and damage from climate hazards and to respond to and withstand natural hazard events that might otherwise impact the community.

- ☑ Ensure that developed and redeveloped facilities and infrastructure are designed based on the best and most recent available information, data, and science for current and projected climate hazards and their potential impacts.

- ☑ Prioritize the construction of built infrastructure, such as sewer, water, road, government building, public works, school, community, and emergency facilities, to be in locations that are not vulnerable to climate hazards; promote just and equitable land use; minimize disturbance of natural features; and maximum ecological function.

- ☑ Proactively make investments that minimize vulnerability to climate hazards for existing and new facilities, infrastructure, homes, and businesses.

- ☑ Ensure that development patterns conserve natural resources and account for current and projected climate hazards in order to protect the health, safety, and welfare of people, including emergency responders during natural hazard events, and businesses that are within these areas.

- ☑ Protect historic and cultural resources from current and projected climate hazards.

GOAL OBJECTIVES FOR BUILT SYSTEM FEATURES:

FACILITIES AND INFRASTRUCTURE

- Do not add new pressure to facilities that are impacted by climate hazards without addressing the hazards appropriately.
- Change zoning to transition development out of hazard areas and into appropriate areas for environmental, equitable, and economic sustainability.
- Enforce development laws that require actions that reduce climate hazard vulnerability.
- Redesign, reinforce, and rebuild facilities and infrastructure to address climate hazards, but only where it makes sense to do so considering environmental constraints, natural resource conservation, and current and projected climate hazards.
- Remove impervious surfaces (i.e. depave), install vegetation, and increase ecological function in urbanized areas.
- Ensure people can safely evacuate homes and businesses during a natural hazard disaster.

HOUSING STOCK & BUSINESSES

- Require that new development and improvements to existing development are designed for climate hazards. Take steps to actively transition and relocate development out of areas exposed to current and future climate hazards, when appropriate.
- Address the adverse health impacts associated with climate hazards, such as high temperatures and poor air quality, that relate to the modernization status of homes and businesses.
- Target additional emergency response pre-disaster educational outreach to areas exposed to climate hazards.
- Change zoning to transition development out of hazard areas and into appropriate areas for environmental, equitable, and economic sustainability.

GOALS FOR A RESILIENT **NATURAL SYSTEM**

- ☑ Preserve and restore the natural resource assets of the municipality to maintain local and regional ecological health and ecosystem services.
- ☑ Restore, connect, and protect natural habitats and environmentally sensitive lands, including steep slopes, wetlands, and riparian areas, from impacts related to built development, environmental conditions, and climate hazards.
- ☑ Remove and reduce impervious surfaces (i.e. depave) to create areas of sustained ecological function in urbanized areas and reduce climate hazard impacts such as extreme heat and flooding.
- ☑ Manage surface water, groundwater, and riparian areas for the conservation and protection of water quality and quantity.

GOAL OBJECTIVES FOR NATURAL SYSTEM FEATURES:

NATURAL LANDS RESOURCES

- Protect, restore, and create habitats and natural areas, prioritizing areas that provide ecosystem services and natural resource assets.
- Safeguard habitats and ecosystems from current and projected climate hazard damage.
- Built environment features within the natural system.

WATER SOURCE RESOURCES

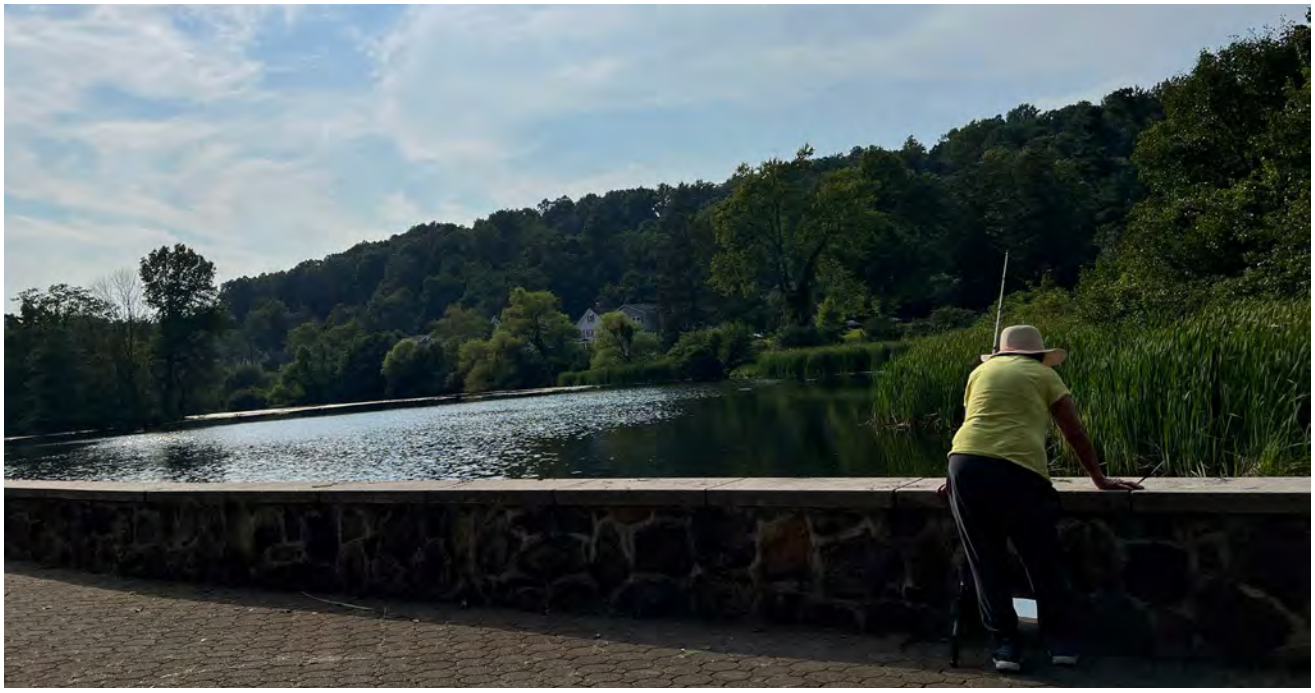
- Conserve water quality by eliminating stormwater runoff with contaminants into surface water and groundwater.
- Conserve water quantity by reducing heat stress to and evaporation from aquatic habitats.
- Restore water quantity by maximizing groundwater recharge via in situ soil infiltration of precipitation.

AIR QUALITY

- Improve baseline air quality to reduce exposure of people to poor air quality that is caused or exacerbated by climate hazards.

GOALS FOR A RESILIENT **SOCIAL SYSTEM**

- ☑ Ensure all development is environmentally and socially just.
- ☑ Prioritize socially vulnerable populations when considering health, economic and other impacts and benefits of environmental and social conditions and investments, including those concerning climate hazards.
- ☑ Adequately assess and reduce the exposure and sensitivity of people to natural hazards, such as extreme heat, flooding, landslides, and wildfire.
- ☑ Avoid unintended negative consequences and ensure the fair treatment and meaningful involvement of all residents, particularly socially vulnerable populations, in the development and implementation of climate hazard adaptation strategies.
- ☑ Ensure the equitable distribution of positive outcomes resulting from municipal investments and decisions.
- ☑ Optimize availability of, and access to, emergency facilities and services to address the needs of socially vulnerable populations and provide support to the public in response to a natural hazard event.



Source: *Mobility Labs, for the Urban Institute.*

"The social sector infrastructure is the support system that helps the social sector thrive. It is an ecosystem of providers that offer services focused on sustainability, learning, relationships, and influence to social sector organizations, groups, and individuals." (the Urban Institute)

GOAL OBJECTIVES FOR THE SOCIAL SYSTEM:

PEOPLE

- Prioritize and engage socially vulnerable populations.
- Require buildings to address human health impacts of current and projected climate change and reduce greenhouse gas emissions and energy usage.
- Require and install infrastructure improvements to reduce peoples' vulnerability to urban heat island and flooding.
- Address immediate impacts and underlaying social disparities associated with environmental injustices.
- Provide adequate support for the community to cope with increases in temperature and precipitation, even during times that are not declared a natural hazard disaster event.
- Ensure protocols and resources are in place to assist the community during a natural hazard event.
- Maintain open and transparent dialog and partnerships with the community.

GOALS FOR A RESILIENT **ECONOMIC SYSTEM**

- ☑ Concentrate development and redevelopment on infill sites that use existing infrastructure and services, are not exposed to climate hazards, and support ecosystem services in urban areas.

- ☑ Promote a balanced land-use mix for fiscal sustainability characterized by residential and nonresidential land uses.

- ☑ Achieve a jobs-to-housing balance that enables people who work in and serve the community, such as public and service workers, to afford to live in the municipality.

- ☑ Protect and promote agriculture and preserve the natural resources on which agriculture depends through efforts to reduce chemical-use, avoid non-point source water pollution, prevent soil erosion, and support education and resources made available to farmers and farm workers.

- ☑ Promote agricultural practices that sustain soil quality and quantity, such as organic farming, integrative pest management, no-till farming, crop diversification, and crop rotation.

- ☑ Support eco-tourism and agri-tourism.

- ☑ Promote energy-efficient design for all development and redevelopment.

GOAL OBJECTIVES FOR ECONOMIC SYSTEM FEATURES:

SUSTAINABLE ECONOMIC DEVELOPMENT

- Make sure people in varying job sectors and income levels can afford to live and work in the town.
- Make sure economic development is not happening in climate hazard areas, and if economic development does occur in hazard areas, it should only be to safeguard high-density regional economic centers.
- In high-density regional economic centers, reinforce built infrastructure to prepare for current and projected climate hazards.
- If an economic resource is affected by current or projected spatially-defined climate hazards, start planning for relocation or reinforcement now.
- Coordinate economic development planning with creation of natural areas and green infrastructure.

WORKING LANDS

- Protect agricultural soils from development disturbance and climate hazards in support of the farming economy, local food production, and leveraging soil as a carbon sink.
- Maintain soil quality by actively promoting and supporting best practices for soil management in agriculture, including organic, no-till, cover crops, and crop rotation.
- Assist farmers to practice sustainable agriculture that includes best practices in soil management and adaptation to climate change.
- Restore riparian areas in agriculture zones to keep sediment out of the streams and the streams from flooding farms.

OUTDOOR RECREATION

- Seek data to make informed decisions that support outdoor recreation and consider the ramifications of outdoor recreation climate hazard vulnerabilities for the local economy, jobs and livelihoods, and recreational opportunities.
- Collaborate across sectors to promote outdoor recreation industries and identify climate adaptation solutions.

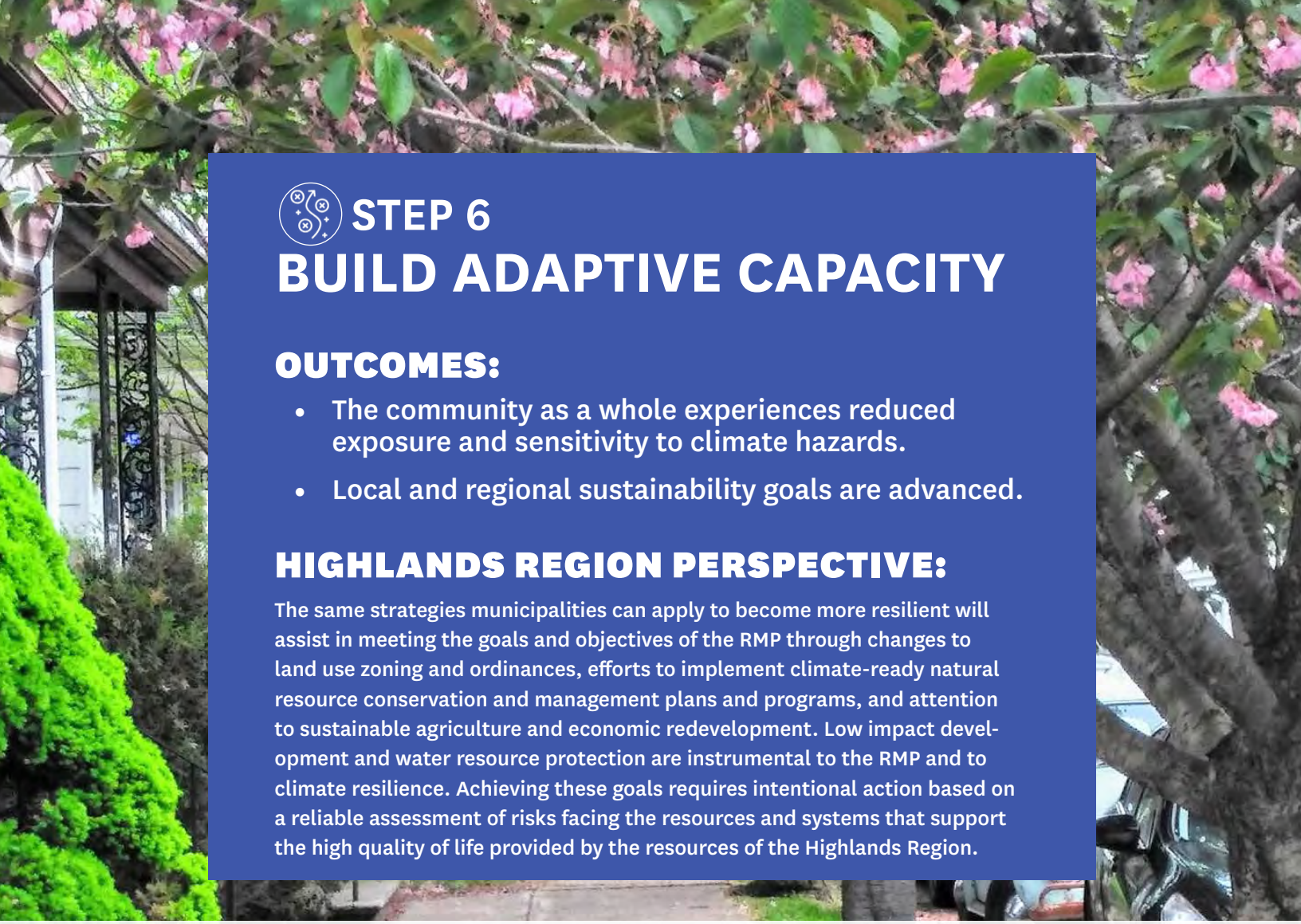
GOALS FOR A RESILIENT **GOVERNANCE SYSTEM**

- ☑ Have transparency in planning and land use decision-making processes and provide for meaningful community engagement through intentional and authentic actions and community-based leadership.
- ☑ Provide ongoing, understandable information in multiple, easily accessible formats and languages throughout planning processes.
- ☑ Ensure equitable zoning and land use.
- ☑ Build the capacity of the municipal government to absorb and adapt to shocks and stresses resulting from a changing climate while becoming better positioned to respond in the future, pursued through a dynamic, iterative, and ongoing process of learning and changing.
- ☑ Regularly and iteratively make changes to municipal plans, policies, regulations, and practices in order to cope with climate change and variability, make proactive decisions informed by climate change-related data, swiftly respond to natural hazard events, and take advantage of opportunities and pursue goals that advance social and environmental sustainability in the context of climate variability and uncertainties.
- ☑ Implement actions that reduce greenhouse gas emissions, promote carbon sequestration from the atmosphere, and shift infrastructure and the economy toward renewable energies.

GOAL OBJECTIVES FOR THE GOVERNANCE SYSTEM:

MUNICIPAL ADAPTIVE CAPACITY

- Adopt regulations and policies that reduce vulnerabilities to current and projected climate hazards.
- Enforce regulations and policies that reduce vulnerabilities to current and projected climate hazards.
- Embed the CCRHVA and climate adaptation planning and implementation across all municipal policies, regulations, and practices.
- Fully integrate equity and social, environmental, and economic sustainability into climate adaptation planning and vice versa.
- Maintain meaningful and intentional community engagement that considers lived experiences and prioritizes socially vulnerable populations to make amendments and updates to climate adaptation plans and actions.
- Develop a Capital Improvement Plan grounded in the CCRHVA and invest wisely in strategies that holistically reduce vulnerabilities to climate hazards.



STEP 6

BUILD ADAPTIVE CAPACITY

OUTCOMES:

- The community as a whole experiences reduced exposure and sensitivity to climate hazards.
- Local and regional sustainability goals are advanced.

HIGHLANDS REGION PERSPECTIVE:

The same strategies municipalities can apply to become more resilient will assist in meeting the goals and objectives of the RMP through changes to land use zoning and ordinances, efforts to implement climate-ready natural resource conservation and management plans and programs, and attention to sustainable agriculture and economic redevelopment. Low impact development and water resource protection are instrumental to the RMP and to climate resilience. Achieving these goals requires intentional action based on a reliable assessment of risks facing the resources and systems that support the high quality of life provided by the resources of the Highlands Region.

TAKE ACTION:

➔ Use the CIP Project Form Template provided with this guidance to align municipal investments with climate adaptation and sustainability goals.

➔ Use the Climate Adaptation Action Plan Template provided with this guidance to help fulfill the objectives of climate-ready goals in guiding the efforts and actions of all municipal departments, committees, and boards.

➔ Implement governance strategies to reduce vulnerabilities to climate hazards by working through Part III of the Model CCRHVA.

HOW TO APPROACH BUILDING ADAPTIVE CAPACITY

ACTIVATE STRATEGIES TO IMPROVE MUNICIPAL GOVERNANCE TO REDUCE VULNERABILITIES

There are many steps municipalities can take to increase their adaptive capacity. **Below are key strategies that are suitable for all municipalities to consider, regardless of how they are structured or their particular vulnerabilities to climate hazards.** For more detailed items, see the Municipal Governance worksheet in the Model CCRHVA.

PRO TIP

Implementation goals in the CCRHVA Assessment and Strategy Tools section that READY the community can increase adaptive capacity.

Key Adaptive Capacity Strategies:

- Designate a local climate and sustainability officer/manager to ensure ongoing attention to assessing vulnerabilities to climate hazards and coordination of the implementation of adaptation actions.
- Conduct robust, inclusive community outreach and engagement.
- Adopt a policy and take steps to embed sustainability and climate adaptation within all municipal departments and elected and appointed boards and committees.
- Install mechanisms to be prepared and capable of adjusting projects, regulations, and operations based on dynamic climate-related data and conditions.
- Align all existing and future planning documents with the municipality's CCRHVA and climate adaptation action plan. Ensure that impl-mentation of pre-CCRHVA plans and designs responds to the climate hazards identified in the CCRHVA.
- Update all land use and zoning ordinances to comply with minimum state, regional, and federal requirements regarding stormwater and floodplain management and restrictions on development in environmentally sensitive areas. Exceed minimum requirements as appropriate to adequately address current and projected climate hazards.
- Track substantial damage to properties in a database.
- Incorporate climate adaptation project expenditures into the municipal capital improvement budget and recurring costs into the annual operating budget.

INCORPORATE THE CCRHVA OUTPUTS INTO AN ACTION PLAN

An action plan facilitates the leap from planning to implementation. It identifies specific actions concerning components of responsibility, funding, time frames, and other aspects that ensure feasibility and create a blueprint to implement identified strategies. Municipalities in the Highlands Region can differ greatly from one another in many regards, so there is not a single action plan that will suit every municipality. This step will provide general guidance for what municipalities should pay particular attention to in their CCRHVA and implementation of the strategies identified in the CCRHVA process, depending on the types of land use they would like to support (e.g. economic development, agriculture, natural resources, etc.). All municipalities in the region should adhere to the goals, objectives, and policies of the RMP, and they need to ensure water source resource protection. However, since there is variety among communities, there will be variety as to where the focus of sustainability and climate adaptation planning lies for any particular municipality.

One thing that all municipalities should develop as a mainstay for implementing strategies and action plans is a Capital Improvement Plan (CIP), which is driven by the municipal master plan.

Overview of a Capital Improvement Plan

A municipality's CIP can be an extremely useful tool to directly incorporate its climate-ready goals and strategies into the trajectory of its future growth to reduce climate hazard vulnerability and promote community resilience. The CIP is a fundamental planning blueprint used to map out a community's capital expenditures and can serve an essential role in coordinating community planning, financial investment, and physical development. The CIP encourages careful project planning and design to avoid costly mistakes and can help translate a community's vision into practical action.

According to the MLUL, a governing body "may authorize the planning board … to prepare a program of municipal capital improvement projects projected over a term of at least 6 years, and amendments thereto."[26] A municipality can employ a CIP to systematically evaluate and devise sustained and innovative strategies to fund and progressively implement future adaptation and restoration projects to reduce climate hazard vulnerabilities of community assets. Through the CIP, a municipality can use the hazard impact scoring conducted in its CCRHVA to identify, rank, and prioritize capital projects.

A CIP is composed of two parts—a capital program and a capital budget. The capital program identifies capital items, which are typically defined as tangible assets or projects that cost more than a certain threshold (e.g., $25,000) and that have a minimal useful life span (such as six years). It also provides a planning schedule and offers financing options. The capital budget is the upcoming year's spending plan for capital items, which is presented to the legislative body for approval.

CIPs often include improvements to public infrastructure such as roadways, fire and police stations, stormwater systems, sewer and water lines, water supply and storage facilities, wastewater treatment facilities, and other critical infrastructure vital to community functioning.[27, 28] A CIP also customarily includes relatively non-recurring major equipment purchases (e.g. construction equipment, fire trucks, a municipal vehicle fleet, or the replacement of lead water lines) and installation, upgrades, and/or repairs of facilities, government buildings, and infrastructure. These investments include improvements to parks, libraries, recreation and community centers, the town hall, and pedestrian and streetscape infrastructure such as sidewalks and street trees. CIP items can include the acquisition of land for public use and investments that reduce climate hazard vulnerabilities, such as by restoring ecosystem function that mitigates flooding, installing tree canopies to reduce urban heat islands, and establishing public resources, cooling centers, for use during a natural hazard event or to mitigate public health impacts of climate hazards. Regularly occurring expenditures to sustain the benefits of capital improvements—primarily routine operations or ongoing maintenance costs such as those associated with water or electric service, park and street tree upkeep, and facility maintenance—should be included in the municipality's annual operating budget.

The following general steps are involved in preparing a CIP.

1. The planning board is authorized by the MLUL to prepare the CIP, which is a means to implement the master plan. Assign department responsibility for assembling the CIP. This could be the chief financial officer, municipal administrator, and the municipal planner. To identify climate adaptation items for the CIP, include the CCRHVA lead, the climate adaptation and sustainability officer, the floodplain manager, and/or the manager for the required MS4 stormwater program in the process.
2. Prepare an inventory of existing capital assets. A considerable portion of a CCRHVA is devoted to mapping the municipality's built, natural, social, and economic assets and assessing the extent to which these assets are exposed or sensitive to climate-change related hazards and risk. This information provides a signifi-cant starting point from which to complete this step.
3. Determine the status of previously approved

capital projects. The community may be developing its initial CIP and budget, but it has undoubtedly already undertaken a range of capital projects. The status and description of these should be added to the CIP.

4. Solicit, compile, and evaluate project requests. As described in this guidance, there is a wide variety of projects directly related to reducing vulnerabilities to climate hazards for each of the five systems that sustain the municipality: Built, Natural, Social, Economic, and Governance.
5. Establish project priority and ranking. In order to directly integrate and prioritize climate adaptation actions into the CIP, project priorities should be focused on reducing vulnerability based on the information learned through the municipal CCRHVA.
6. Develop a CIP financing plan based on the municipality's financial capacity. There are several methods to finance capital improvement projects including bonding indebtedness, strategically managing local financial resources, and taking advantage of state and federal grants.
7. Annually review the CIP. Although the CIP is a multi-year program, it should be reviewed each year to monitor progress, which allows for mid-course corrections that may be needed and ensures response to revised financial policies and resources, as well as the community's evolving social and environmental conditions. Presentations of the periodic review to the governing body affords an opportunity to engage the public, demonstrate implementation performance, and highlight accomplishment.

In addition to being an essential project planning, implementation, and financing tool, the CIP can also serve as an important public information resource. Creating an online capital project report card,[29] which provides current information on the municipality's progress on project implementation, will keep the public informed about current and future public improvements. In turn, this will provide a level of certainty to residents, developers, and business owners regarding community vitality, tax burdens, and service costs. A report card will also focus attention on community objectives and fiscal capacity, which can help build community support for continuing public investments in ongoing and future climate change-related plans and implementation initiatives.

Climate Adaptation Action Plan Considerations

A CIP may be all that is needed for some municipalities to begin implementing actions. For those communities that prefer to develop an action plan, a template is provided with this guidance. The types of strategies and actions in a plan will be determined by the specific needs and circumstances for a particular community. Certain climate hazards, such as flooding, high temperatures, and storms, are of priority concern across the state. Other hazards, such as landslides, are more limited in their range of exposure. The CCRHVA process is intended as a means for municipalities to reflect on the climate hazard vulnerabilities that affect the people, environment, and economy within their borders.

For municipalities in the Highlands Region, the CCRHVA must be conducted in the context of the RMP, with consideration of vulnerabilities of the water supply and natural and cultural resources within the municipality that constitute components of the Highlands Region. **Local Climate Adaptation Action Plans in the Highlands Region present an opportunity to leverage efforts and resources to integrate land use, sustainability, and climate adaptation planning into a single action plan.**

PRO TIP

A Climate Adaptation Action Plan stems directly from the LUPE and CCRHVA. The LUPE Template provided with this guidance contains sustainability and climate adaptation goals and strategies, and a Climate Adaptation Action Plan Template is also provided.

A key land use action to reduce vulnerability to climate hazards includes adoption of new zoning ordinances and zoning overlays to development in high hazard areas, as appropriate. Preservation and restoration of natural resources that provide ecosystem services to mitigate climate hazards is also paramount.

To espouse sustainability, an action plan should center equity, environmental justice, and socially vulnerable populations. In developing and implementing an action plan, inclusive and representative engagement with all sectors of the public should be maintained. For those municipalities that contain overburdened communities[30] or environmental justice communities,[31] heightened diligence should be applied to engage these communities and address their immediate and long-term concerns.

Prior to developing the Climate Adaptation Action Plan, consideration should be given to the types of land use and features the community endeavors to support. The Climate Adaptation Action Plan Template provided with this guidance offers the systems approach as a framework to strategically reduce climate hazard vulnerabilities—categorizing strategies and actions as reducing vulnerabilities to the Built, Natural, Social, Economic, or Governance systems that sustain the community.

The Climate-Ready Strategies section of this guidance is organized to help municipalities effectively identify associated goals and strategies for focusing on certain land uses and other features. For example, municipalities with extensive agricultural resources will want to focus on "Strategies to Reduce Vulnerabilities to Working Lands," while those with higher-density urban centers will look closely at "Strategies to Reduce Vulnerabilities to Sustainable Economic Development." All Highlands municipalities should focus on "Strategies to Reduce Vulnerabilities to Water Source Resources," and most will also pay close attention to "Strategies to Reduce Vulnerabilities to Natural Lands Resources." All municipalities should prioritize "Strategies to Reduce Vulnerabilities to People" and "Strategies to Improve Municipal Governance to Reduce Vulnerabilities."

CCRHVA ASSESSMENT AND STRATEGY TOOLS

HIGHLANDS-SPECIFIC ANALYSIS OF CLIMATE HAZARD VULNERABILITY

CLIMATE-READY STRATEGIES

BUILT SYSTEM

Model CCRHVA Analysis: PHYSICAL DAMAGE

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE (*A1, A5, A7, A11, A13, A15*) Identify priority facilities/ infrastructure within areas of current and projected spatially-defined hazards. Identify priority facilities/ infrastructure within areas of high impervious surface. **SENSITIVITY** (*A2*) Identify priority facilities/ infrastructure classified as repetitive loss or severe repetitive loss in the FEMA NFIP program. Identify priority facilities/ infrastructure structures not in compliance with design and substantial damage provisions of an adopted municipal code coordinated ordinance. Identify priority facilities/ infrastructure that may be damaged physically due to acute or chronic exposure to non-spatially-defined hazards.	**EXPOSURE** Map(s) and table(s) of priority facilities/infrastructure location points with current and projected spatially-defined hazards. Map(s) and table(s) of high impervious surface and priority facilities/ infrastructure location points within areas of high impervious surface. List of priority facilities/infrastructure features that are susceptible to physical damage due to current and projected non-spatially-defined hazards. **SENSITIVITY** Table(s) of the number of public facilities that are RL and SRL properties and/or do not meet the building code for flood damage.	**HISTORIC/ ARCHAEOLOGICAL** • Historic Property Points • Historic Properties • Archaeological Site Grid • Historic Districts **TRANSPORTATION** • Airports • Bus Stops • Bus Routes (public & private) • Canals and Water Raceways • Roads/NJ Roadway Network • Railroad (passenger) • Railroad Stations • Park and Rides • Park Service Trails • New Jersey Statewide Trails • Highlands Trail **CONTAMINATION** • Known Contaminated Sites List • New Jersey Pollution Discharge Elimination System (NJPDES) Regulated Facility Locations Sites • NJEMS (New Jersey Environmental Management System) Sites • Deed Notice Extent • Underground Storage Tanks Facilities **BUILT INFRASTRUCTURE IMPACT** • Carbonate Rock Areas • Impervious Surface

BUILT SYSTEM

Model CCRHVA Analysis: OPERATIONAL DAMAGE

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(B1, B5, B7, B15)* Identify evacuation routes and important ingress/egress locations that may have operations impacted by overlap with current and projected spatially-defined hazards. Identify evacuation routes and important ingress/egress locations that are highly impacted by heavy snow/ice. **SENSITIVITY** *(B2, B6, B8, B12, B14, B16, B19, B20)* Identify undersized utilities and storm sewer systems. Identify trends in measures of capacity impacts resulting from hazard events (e.g. water utility pathogens, water conservation alerts, service disruption, consumer demand level, etc.), including consideration of exposure to vector-borne disease outbreaks.	**EXPOSURE** Map(s) and table(s) of roads, labeled evacuation routes, and important ingress/egress locations that may have operations impacted by current and projected spatially-defined hazards. Map(s) and table(s) of roads, labeled evacuation routes, and important ingress/egress locations that are experiencing capacity constraints and performance disruptions or declines due to exposure to heavy snow/ice. **SENSITIVITY** Table(s) of facilities/infrastructure features that are experiencing capacity constraints and performance disruptions or declines due to undersized utilities or storm sewer systems and/or hazard events (e.g. water utility pathogens, water conservation alerts, service disruption, consumer demand level, etc.). Table(s) of facilities/infrastructure features that are experiencing capacity constraints and performance disruptions or declines due to exposure to vector-borne disease (e.g. fresh water conveyance).	**TRANSPORTATION ASSETS** • Roads (NJ Roadway Network) • Transportation Score >=3 (regional multimodal opportunities) **BUILT INFRASTRUCTURE IMPACT** • Carbonate Rock Areas

BUILT SYSTEM

Model CCRHVA Analysis: RESIDENTIAL & COMMERCIAL STRUCTURES

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(C1, C5, C7, C15)* Identify residential and commercial structures within areas of current and projected spatially-defined hazards. Identify residential and commercial structures within areas of high impervious surface. **SENSITIVITY** *(C2)* Identify residential/commercial structures classified as repetitive loss or severe repetitive loss in the FEMA NFIP program. Identify residential/commercial structures not in compliance with design and substantial damage provisions of an adopted municipal code coordinated ordinance. Evaluate the number of residential/commercial structure flood insurance policies and claims filed relative to current and projected flood areas. Evaluate the overall condition/modernization of residential/commercial structures by evaluating the average year built. Identify residential and commercial structures in areas where base flood elevation will raise the height of the structure to expose it to higher wind forces.	**EXPOSURE** Map(s) of residential and commercial building footprints with current and projected spatially-defined hazards. Table(s) of parcels that contain residential or commercial structures with current and projected spatially-defined hazard exposure. Map(s) and table(s) of high impervious surface and residential and commercial structure location points within areas of high impervious surface. **SENSITIVITY** Map(s) and table(s) including parcels with any residential or commercial structure meeting any of the sensitivity criteria for current or projected spatially-defined hazards. Table(s) of parcels with residential or commercial structures in areas where base flood elevation will raise the height of the structure to expose it to current or projected higher wind forces.	**BUILT INFRASTRUCTURE IMPACT** • Carbonate Rock Areas

Model CCRHVA Analysis: PUBLIC & AFFORDABLE HOUSING SITING

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(D1, D5, D7, D15)* Identify existing and proposed public and affordable housing units and developments exposed to current or projected areas of spatially-defined hazards. Identify existing and proposed public and affordable housing units and developments within areas of high impervious surface. **SENSITIVITY** *(D2)* Identify existing and proposed public and affordable housing unit and development structures classified as repetitive loss or severe repetitive loss in the FEMA NFIP program. Identify existing and proposed public and affordable housing unit and development structures not in compliance with design and substantial damage provisions of an adopted municipal code coordinated ordinance. Evaluate the number of existing and proposed public and affordable housing units and development structure flood insurance policies and claims filed relative to current and projected flood areas. Evaluate the overall condition/ modernization of existing and proposed public and affordable housing units and development structures by evaluating the average year built. Identify existing and proposed public and affordable housing units and development structures in areas where base flood elevation will raise the height of the structure to expose it to higher wind forces.	**EXPOSURE** Map(s) and table(s) of existing and proposed public and affordable housing parcels with current and projected spatially-defined hazards. Map(s) and table(s) public and affordable housing units and developments within areas of high impervious surface. **SENSITIVITY** Maps(s) and Table(s) including parcels with any existing or proposed public or affordable housing structure meeting any of the sensitivity criteria for current or projected spatially-defined hazards Table(s) of parcels with existing and proposed public and affordable housing structures in areas where base flood elevation will raise the height of the structure to expose it to current or projected higher wind forces.	**BUILT INFRASTRUCTURE IMPACT** • Carbonate Rock Areas

NATURAL SYSTEM

Model CCRHVA Analysis: PROTECTED NATURAL LANDS & THEIR BUFFERS FOR MIGRATION

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(E1, E5, E7)* Identify natural lands and their buffers within areas of current and projected spatially-defined hazards. **SENSITIVITY** *(E2, E6, E12, E14, E22)* Identify riparian areas that overlay with alluvium soils. Identify all current and potential natural lands and buffers for migration that currently or could potentially provide ecosystem services, including preserved and unpreserved lands. Identify unpreserved old growth forest tracts that are not protected from development. Evaluate changes in habitat locations due to changes in temperature and precipitation.	**EXPOSURE** Map(s) and table(s) of natural lands and their buffers for migration, overlaid with current and projected spatially-defined hazards. Map(s) and table(s) showing indication of riparian areas with soils demonstrating a potential need for floodplain restoration. **SENSITIVITY** Map(s) and tables of natural lands areas with high ecosystem function and ability to provide ecological services.	**NATURAL LANDS - TOTAL AREA AND PRIORITY AREAS** • Total Forest Area • Forest Resource Area • Confirmed Vernal Pool with 300-Meter Buffer • Riparian Areas • Significant Natural Areas • Special Environmental Zone • Prime Groundwater Recharge Areas • Steep Slope Protection Area • Ten-Foot Contours **ZONING PROVISIONS OF NATURAL LAND AREAS** • Composite Zoning **PRESERVATION STATUS OF PRIORITY NATURAL LANDS** • Preserved Lands

NATURAL SYSTEM

Model CCRHVA Analysis: BIODIVERSITY AND CONNECTIVITY

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(F1, F5, F7)* Identify species habitat and wildlife corridors within areas of current and projected spatially-defined hazards. **SENSITIVITY** *(F12, F14, F22)* For priority natural lands, assess biodiversity and connectivity through ecological studies and surveys. In forested areas, estimate tree regeneration rates. Evaluate the presence/absence of wildlife corridors in areas of priority for species movement. Estimate deer populations and overbrowsing to identify areas where the deer population exceeds 15 per square mile.	**EXPOSURE** Map(s) and table(s) of species habitat and wildlife corridors with current and projected spatially-defined hazards. **SENSITIVITY** Study results (and maps) for biodiversity, connectivity, tree regeneration, and deer populations and herbivory. Map(s) of existing wildlife corridors, deficiencies in corridor presence, and which corridors are exposed or sensitive to current and projected non-spatially-defined hazards.	**SPECIES HABITAT** • Forest Integrity Score • Riparian Integrity Score • Watershed Values • Critical Wildlife Habitat **CORRIDORS FOR SPECIES MOVEMENT** • Terrestrial Wildlife Habitat Cores and Corridors in New Jersey, Connecting Habitat Across New Jersey **ZONING PROVISIONS OF HABITAT AND WILDLIFE CORRIDOR AREAS** • Composite Zoning **PRESERVATION STATUS OF HABITAT AND WILDLIFE CORRIDOR AREAS** • Preserved Lands

Model CCRHVA Analysis: URBAN ECOLOGY

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
SENSITIVITY *(G12, G14, G22)* Estimate existing/absence and possible tree canopy. Identify vacant parcels and other areas for potential rewilding and restoration.	**SENSITIVITY** Map(s) and table(s) of urban tree canopy. Map(s) and table(s) of potential tree canopy and natural area development.	**URBAN TREE CANOPY** • Land Use/Land Cover 2015

Model CCRHVA Analysis: WATER QUALITY

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(H1, H5)* Calculate the ratio of impervious surface for the total land area of the municipality, urban land area, and flood and mudslide/landslide hazard areas. Identify the amount of wellhead protection areas, carbonate rock areas, and Highlands open water protection areas covered by impervious surface. Identify water resources that can be impacted by areas prone to mudslides/landslides. **SENSITIVITY** *(H2, H14)* Identify point and nonpoint source contamina-tion from chemical applica-tion to lawns or agricultural fields, known contaminated sites, or other contamination sources. Test water quality of streams and lakes. Evaluate harmful algal bloom (HAB) contamination.	**SENSITIVITY** Table(s) of impervious surface calculation in the total land area of the municipality, urban land area, and flood and mudslide/landslide hazard areas. Area calculation(s) of wellhead protection areas, carbonate rock areas, and Highlands open water protection areas covered by impervious surface. Map(s) of current and projected mudslides/landslides, showing areas at the base of the slope where sediment can run off into waterways. **SENSITIVITY** Map(s), table(s), and/or narrative of potential sources of chemical contamination. Map(s) and table(s) of water quality test results for each water body tested, including harmful algal bloom (HAB) contamination.	**GROUNDWATER AND SURFACE WATER RESOURCES** ● Waterbodies ● Reservoirs ● Bedrock Aquifers ● Surficial Aquifers **IMPERVIOUS SURFACE IMPACT** ● Impervious Surface (2015) ● Wellhead Protection Areas for Public Community Water Supply Wells ● Wellhead Protection Areas for Non-Community Water Supply Wells ● Carbonate Rock Areas ● Highlands Open Water Protection Areas **POTENTIALCONTAMINATION** ● Steep Slope Protection Area ● Surface Water Discharge Locations ● Known Contaminated Sites ● New Jersey Pollution Discharge Elimination System Regulated Facility Locations ● Underground Storage Tank Facilities ● Active Mines ● Quarries ● Agricultural Uses ● Solid Waste Landfill Sites (35 Acres and Above) ● Autobody Shops ● Dry Cleaners ● Gas Service Stations **WATER QUALITY TESTING** ● Total Maximum Daily Load ● Ambient Stream Quality Monitoring Sites ● Current Known Extent of Groundwater Contamination (Groundwater Contamination Areas-CKE) ● Extent of Groundwater Contamination within Designated Classification Exception Areas and Well Restriction Areas (Groundwater Contamination Areas-CEA). ● Surface Water Discharge Locations

Model CCRHVA Analysis: WATER QUANTITY

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(I11, I13)* Identify water source resources that may be depleted due to acute or chronic exposure because of current and projected increased/extreme temperature or drought, including unvegetated stream corridors and lake coasts. Identify the amount of water recharge areas that are covered by impervious surface. **SENSITIVITY** *(I14)* Identify the water recharge areas where local zoning permits development of impervious surfaces. Amount of water available.	**EXPOSURE** Map(s) and table(s) of water source resources that have potential to be depleted due to current and projected temperature or drought conditions, including unvegetated stream corridors and lake coasts. Map(s) and table(s) of water recharge areas covered by impervious surface. **SENSITIVITY** Map(s) and table(s) of water recharge areas not presently covered by impervious surface and where zoning regulations permit impervious surface.	**UNVEGETATED STREAM CORRIDORS AND LAKE COASTS** • Waterbodies • Highlands Open Water Protection Areas • Land Use/Land Cover 2015 **IMPERVIOUS SURFACE IMPACT** • Groundwater Recharge Areas • Impervious Surface (2015) • Prime Groundwater Recharge Areas • Highlands Open Water Protection Areas • Composite Zoning • Designated Areas in Need of Redevelopment • Endorsed Plans (of the NJ State Development and Redevelopment Plan) • State Plan Designated Center **WATER AVAILABLE** • Net Water Availability

Model CCRHVA Analysis: AIR POLLUTION

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(J1, J7)* Identify developed areas (i.e. urban land cover) where air quality may be compromised due to severe or prolonged exposure because of overlap with current and projected areas of spatially-defined hazards. **SENSITIVITY** *(J2, J8, J12, J14, J16)* Monitor air quality trends and predictions.	**EXPOSURE** Map(s) of developed areas (i.e. urban land cover) and current and projected flood and wildfire hazard areas. **SENSITIVITY** Table(s) of results of air quality measurements over time (e.g. particulates and ozone).	**AIR POLLUTION CONCERN AREAS** • Land Use/Land Cover 2015 **AIR POLLUTION TESTING** • Ambient Air Quality Monitors

SOCIAL SYSTEM

Model CCRHVA Analysis: PUBLIC HEALTH

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(K1, K5, K7, K11)* Intersect census blocks with areas of current and projected spatially-defined hazards to calculate the percent of the total municipal population and provide a demographic profile of population living in these areas. Conduct a heat island analysis to calculate the total and the percent of the municipal population living in heat island areas and evaluate population and housing characteristics of these areas. **SENSITIVITY** *(K2, K6, K8, K12, K16, K20)* Evaluate public access to evacuation centers, heating/cooling/charging centers, and healthcare/wellness/food/financial supports and resources. Evaluate the overall condition/modernization of residential and commercial structures by evaluating the average year built.	**EXPOSURE** Map(s) and table(s) of census blocks intersecting with current and projected spatially-defined hazard areas, including population data for intersecting areas. Map(s) of heat islands. Table of the total and the percent of the municipal population within each heat island. **SENSITIVITY** Map(s) and table(s) of public health resource locations relative to spatially-defined hazards, roadways impacted by spatially-defined hazards, and mobility/transportation resources, barriers, and patterns. Table(s) of parcels with any residential or commercial structure that may not be built to withstand extreme temperature or mitigate impact to health (e.g. no air conditioning).	**TRANSPORTATION** • Roads • Bus Stops • Bus Routes • Railroad Stations • Park and Rides **EMERGENCY AND SAFETY** • Emergency Medical Service Stations • Fire Stations • Hospitals • Local Law Enforcement Locations

SOCIAL SYSTEM

Model CCRHVA Analysis: VULNERABLE POPULATIONS

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(L1, L5, L7, L11)* Identify vulnerable populations, overburdened communities, and environmental justice communities in areas of current and projected spatially-defined hazards. Identify socially vulnerable populations, overburdened communities, and environmental justice communities in heat island areas. **SENSITIVITY** *(L2, L6, L8, L12, L16, L20)* Evaluate social determinants of health in the community. Identify measures of distress on which the municipality ranks high compared to the rest of the state. Evaluate the overall condition/ modernization of existing public and affordable housing structures by evaluating the average year built.	**EXPOSURE** Map(s) and table(s) of socially vulnerable populations, overburdened communities, and environmental justice communities within current and projected spatially-defined hazards areas. Map(s) and table(s) of socially vulnerable populations, overburdened communities, and environmental justice communities within heat island areas. **SENSITIVITY** Map(s) and table(s) describing social determinants of health relevant to the community and the community's municipal revitalization index. Table(s) of parcels with any public or affordable housing structure that may not be built to withstand extreme temperature or mitigate impact to health (e.g. no air conditioning).	**TRANSPORTATION** • Roads • Bus Stops • Bus Routes • Railroad Stations • Park and Rides **EMERGENCY AND SAFETY** • Emergency Medical Service Stations • Fire Stations • Hospitals • Local Law Enforcement Locations

ECONOMIC SYSTEM

Model CCRHVA Analysis: JOBS

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
SENSITIVITY *(M2, M8, M16, M20)* Determine the number of jobs that could be affected by the inability of people to access jobs located within the municipality due to municipal-wide hazard impacts. Determine the number of jobs per employed resident.	**SENSITIVITY** The total number of jobs in the municipality. The number of jobs per employed resident.	NA

Model CCRHVA Analysis: NON-RESIDENTIAL TAX BASE

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(N1, N5, N7)* Identify locations and assessed values of non-residential properties that are within areas of current and projected spatially-defined hazards. **SENSITIVITY** *(N2, N6, N8)* Calculate the proportion of municipal tax revenue from businesses exposed to current and projected spatially-defined hazards.	**EXPOSURE** Map(s) of non-residential parcels that are within areas of spatially-defined hazards. Assessed values of non-residential parcels that are within areas of spatially-defined hazards. **SENSITIVITY** The proportion of municipal tax revenue from businesses exposed to spatially-defined hazards.	NA

ECONOMIC SYSTEM

Model CCRHVA Analysis: FARMING

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
EXPOSURE *(O1, O5, O7)* Identify farmlands within current and projected areas of spatially-defined hazards, indicating areas of prime farmland. **SENSITIVITY** *(O2, O6, O8, O12, O14, O16, O22)* Identify farmlands zoned for non-agricultural use that permit development. Track proportion of farms practicing organic agriculture.	**EXPOSURE** Map(s) and table(s) of farmlands within current and projected areas of spatially-defined hazards, indicating areas of prime farmland. **SENSITIVITY** Map(s) of farmlands and municipal zoning. Map(s) and table(s) of non-agricultural zones and parcels used for agriculture. Map(s) and table(s) of non-organic and organic farm areas, including the proportion of organic to non-organic farms. Table(s) of statistics for farming revenue. Table(s) of crop insurance payments for losses per specific climate hazard.	**FARMLAND ANALYSIS** • Technical Report: Economic Growth Inventory, Economic Sustainability Plan for the Highlands Region. Appendix C. Table 7: Farmland at Risk by Municipality[32] **AGRICULTURAL RESOURCES** • Agricultural Resource Area • Important Farmland Soils (e.g. Prime Soils) • Agricultural Land Uses Greater than 10 acres • Agricultural Landscapes >= 250 acres • Unpreserved Farmland **ZONING** • Zoning (2019)

Model CCRHVA Analysis: ECO-TOURISM

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
SENSITIVITY *(P2, P8, P12, P14, P16, P22)* Estimate potential revenue loss from outdoor recreation dependent on safe, barrier-free, and enjoyable access to healthy outdoor open space areas. Track the number of visitors to natural area outdoor open space sites. Track use-advisories or closures for natural area outdoor open space sites. Estimate the number of jobs and potential loss in income associated with outdoor open space recreation. Estimate the percent contribution of eco-tourism to the local economy. Evaluate biodiversity through ecological studies and surveys. Estimate revenue of outdoor recreation dependent on snow pack.	**SENSITIVITY** Table(s) showing the potential public access and economic impact of climate hazards on open space and public and private natural resource areas used for recreation, including, but not limited to, streams, forests, wetlands, parks, and trails. Results of biodiversity studies showing impact on outdoor recreation eco-tourism value. Revenue of eco-tourism dependent on heavy snow cover, or impacted by other hazards.	NA

Model CCRHVA Analysis: AGRI-TOURISM

ANALYSIS OF IMPACT (*Worksheet 4.2.a Analysis Workflow Matrix Codes*)	ANALYSIS OUTPUT	HIGHLANDS COUNCIL TOOLS GIS DATA
SENSITIVITY *(Q2, Q12, Q14, Q16, Q22)* Estimate revenue of agri-tourism. Track the number of visitors to agricultural outdoor recreation sites. Estimate the number of jobs and potential loss in income associated with agri-tourism. Estimate the percent contribution of agri-tourism to the local economy.	**SENSITIVITY** Table(s) and descriptions showing the potential economic impact of climate hazards on the local economy and farming operations open to the public for agri-tourism, including information about visits, revenues, access, and environmental conditions.	NA

BUILT SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO FACILITIES & INFRASTRUCTURE

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	B2, B3, B6, B7	Concentrate facility and infrastructure capital improvement projects in the areas where development investments are appropriate in relation to current and projected climate hazards and the costs and risks associated with relevant hazards.
	B1-B8	Integrate climate hazard vulnerability into all infrastructure investments, including those associated with the capital budget and any improvements to roads, park facilities, historic sites, utilities, and other types of built structures.
	B1-B4, B7, B8	Update the municipal zoning code to require that in proposals for new or expanded residential, commercial, or industrial development that draws its water supply from ground or surface water sources, there are appropriate water supply and wastewater treatment options, including consideration of capacity constraints and current and projected climate hazard impacts to facilities and their ability to deliver services to the development.[33]
	B1-B4, B6-B8, Hazards Identification and Characterization	Identify appropriate areas for development of facilities and infrastructure to support economic growth and higher-density, compact mixed-use residential and commercial development in areas with existing transportation and utilities and that are not exposed to current or projected climate hazards.
	B1-B8, Build-out Analysis and Assessment of Current and Projected Development	Change zoning districts to restrict all forms of development in areas where facilities and infrastructure, including means of egress, are exposed to current or projected hazards or capacity constraints, and encourage development in appropriate areas as identified through climate hazard assessments and other studies.

*See Step 5 for an explanation of each goal strategy.

**The CCRHVA/LUPE Output column corresponds to the information in the CCRHVA tables shown in Step 4.

BUILT SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO FACILITIES & INFRASTRUCTURE

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	B2, B3, B5, B6, B7	Reduce the load that stormwater systems manage by removing impervious surfaces and reducing total and localized impervious cover, particularly in areas where facilities and infrastructure are vulnerable to current and projected flood hazards.
	B1-B3, B5-B7	Adopt enhanced stormwater management control ordinances[34] that go beyond the NJDEP minimum requirements to further reduce the impact of undersized stormwater systems that may lead to physical or operational damage to infrastructure because they were not designed to handle increasingly intense rainfall events.
	B6, B7	When designing public-funded capital facilities and infrastructure projects, employ strategies such as Low Impact Design and Green Streets[35] that further reduce impervious cover beyond minimum requirements and can provide ecosystem services. Consider designing infrastructure to meet a third-party verification of sustainability and climate resilience, such as the verification awarded through the "Envision" program.
	B3, B7	Collaborate with emergency response staff and public facilities to install crest stage gages in waterways subject to frequent flooding to continuously monitor heights of streams that expose facilities and infrastructure to flooding, and provide for an early and/or automatic warning system when water elevations approach flood levels.
	B1-B4, B8	Coordinate efforts to identify and implement climate adaptation solutions that reduce current and projected climate hazard vulnerabilities to community facilities, such as schools, grocery stores, hospitals, nursing homes, health clinics, community centers, and historic and culturally significant sites.

STRATEGIES TO REDUCE VULNERABILITIES TO HOUSING STOCK & BUSINESSES

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	Hazards Identification and Characterization, Build out and Assessment of Current and Projected Development	Update the municipal zoning code to require all affordable and public housing development projects to be outside areas exposed to spatially-defined current and projected climate hazards, in coordination with changes to zoning restricting development and redevelopment in these areas.
	B9, B10, B12, B13	Adopt a Low Impact Development Ordinance to decrease stormwater runoff and mitigate flood impacts to homes and businesses by increasing infiltration of precipitation into soils. These practices will also "ensure ...reduction in water...losses" and "mitigate potential adverse impacts on the natural environment."[36]
	B9-B14, Hazards Identification and Characterization	Update the municipal code to require substantial damage[37] tracking and stipulate restrictive regulations for rebuilding in designated flood- and erosion-prone areas, wildfire areas, carbonate rock areas, and areas with steep slopes subject to landslides.
	B9, B10, B11, B13, B14	Enforce substantial damage thresholds on properties.
	B9, B12, Hazards Identification and Characterization	Work with property owners through the Highlands Transfer of Development Rights Program to gradually shift development potential away from areas exposed to climate hazards and areas that are environmentally sensitive.
	B9, B10, B12, B13	Update the municipal zoning code to include a provision that new or increased demand for septic system capacity consider environmental capacity constraints and current and projected climate hazard impacts.[38]
	B9, B10, B12, B13	Conduct a stormwater utility feasibility study and consider integrating a stormwater utility fee program to incentivize property owner stormwater reduction actions, fund municipal requirements of an MS4 permit, and install municipal-wide improvements that reduce stormwater runoff.

STRATEGIES TO REDUCE VULNERABILITIES TO HOUSING STOCK & BUSINESSES

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	B9-B14	Require and enforce fire-, wind-, and flood-resistant construction standards,[39] as well as HVAC[40] standards, applicable to all new structures built and for improvements to existing structures.
	B9, B12	Develop and disseminate an evacuation plan that prescribes clear evacuation protocols, with targeted and culturally sensitive outreach prioritized to public and affordable housing facilities. Consider mandatory early evac-uation in the portions of evacuation routes that are exposed to climate hazards.
	B12, B13	Update the municipal zoning code to require all affordable and public housing development and redevelop to include co-benefits of public-access green space and tree canopy to reduce high heat and stormwater runoff impacts in required green infrastructure improvements.
	Hazards Identification and Characterization	Discourage scattered-site development in areas exposed to current and projected wildfire hazards by requiring clustering and the development of new single units in these areas be constructed as close to other structures and roadways as possible.
	B9, B10, B11	Develop a community-based green infrastructure stormwater management program with public participation at community and neighborhood scales to promote groundwater recharge, particularly targeting businesses in areas affected by flooding and extreme temperatures to support improvements to public spaces affecting their properties.[41]
	B9, B12	Encourage community groups to pursue community benefits agreements for developers to install green infrastructure, flood mitigation, and natural area enhancements on- and/or off-site that will reduce flood and heat exposure for homes and businesses.[42]
	B9, B12	Adopt an ordinance to require fire breaks and non-woody buffers (e.g. minimum 100') at building perimeters.

BUILT SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO **HOUSING STOCK & BUSINESSES**		
Climate-Ready Goals*	**CCRHVA/LUPE Output****	**Strategy**
	B9, B12	Pursue Firewise Community Program designation by engaging local homeowners and businesses to prepare the area around their facilities and structures to reduce the risk to wildfire.[43]
	B9, B12	Develop and implement Community Wildfire Protection Plans in coordination with NJ Forest Fire Service to reduce the vulnerability of development in areas exposed to current and projected wildfire hazards.[44]

NATURAL SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO NATURAL LANDS RESOURCES

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	N1-N9	Make zoning and ordinance changes to protect and restore undeveloped areas in ways that reduce climate hazard vulnerability for natural (and built) systems through measures such as:[45] • a conservation and management overlay district ordinance • cluster[46] and conservation design development standards • the prohibition of forest clear cutting [47] • standards that govern forest disturbance to ensure any disturbance does not increase vulnerability of the forest to climate hazards[48] • riparian area standards to restrict development and restore floodplains[49] • **a tree retention ordinance**[50] •  a steep slopes ordinance to promote habitat restoration along slopes and require land stabilization in developed areas
	N2, N3, N7-N9	Depave impervious surfaces and pursue natural area creation and restoration in areas where the dominant land use of the neighborhood is urbanized development, with consideration of best management practices for urban forests, floodplain habitats, and other natural areas to reduce vulnerabilities of these resources to climate hazards in urban environments.
	N1-N7	Pursue natural area restoration in all identified natural resource areas, and areas important for their migration, to reduce the vulnerability of these areas to climate hazards, including the installation of deer fencing and consideration of emerging ecological diseases and invasives. Seek assistance from county open space departments, state and federal forest services, and other professionals and experts in managing invasive species and whitetail deer populations, and to co-ordinate existing forest, and woodland, and reforestation initiatives.

PRO TIP

As part of the January 2023 MS4 permit requirements, municipalities must adopt a Tree Removal-Replacement Ordinance. Municipalities that already have a tree ordinance should check it against the state's draft model ordinance, and all municipalities should verify their ordinances with the forthcoming release of the final ordinance.

NATURAL SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO NATURAL LANDS RESOURCES

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	N1-N9	Develop, update, integrate, and implement plans, with the incorporation of climate adaptation measures based on the CCRHVA outputs, so these activities continue to support the creation, protection, and restoration of natural lands resources and species habitats, including plans such as: • Habitat Conservation and Management Plan • Community Forestry Management Plan[51] • Forest Conservation and Mitigation Plan • Forest Stewardship Plan for Preserved Lands • Stream Corridor Protection/Restoration Plan • Open Space Plan[52] • Redevelopment Plan • Hazard Mitigation Plan
	N1, N2, N6-N9	Adopt preferred or required landscaping techniques applicable to the review of development applications in order to: promote the use of native species in site designs and development standards, discourage expansive lawn areas, and create meadows, woodlands, and other habitats. Adopt more stringent requirements in areas of critical habitat and areas exposed to current and projected climate hazards.
	N1-N19	Permit Environmental Commissions to complete an Environmental Resource Inventory (ERI) and have the authority to review development applications to evaluate the potential environmental impacts and advise the planning and zoning boards. The Highlands Council ERI tool generates ERIs for towns.[53]
	N1-N19	Support sustainability and climate adaptation actions, such as initiatives of the municipal Environmental Commission to conduct specific projects, studies, demonstration projects, and community outreach and education to foster community-wide alignment and effort on sustainability and climate adaptation goals.

NATURAL SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO NATURAL LANDS RESOURCES

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	N8, N9	Implement a community-based street tree program to organize the installation, monitoring, and maintenance of street trees.[54] The program should conduct tree surveys and formulate plans with the goals of reducing urban heat-island impacts, improving air quality, increasing infiltration of precipitation, reducing stormwater runoff, and providing equitable ecosystem services. Recognizing a Public Arbor Day can help galvanize the program.
	N1, N5, N7, N9	Develop a community education and action program to promote land stewardship and develop a "green development checklist"[55] for use in reviewing development applications. The checklist should ensure the use of native species, promote a list of recommended plants, prohibit plantings from a "do not plant" list, and establish design guidelines for landscape plans that illustrate the use of native plants to create habitat. The program should facilitate the use of a Forest Stewardship Plan for landowners of any wooded area.
	N2-N4, N7, N9	Pursue NJDEP Green Acres and Blue Acres acquisitions to create natural areas that aim to reduce climate hazard vulnerabilities for ecosystem function, as well as for public safety.

NATURAL SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO WATER SOURCE RESOURCES

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	N10-N17	Make zoning and ordinance changes to reduce the climate hazard vulnerability of water quality and water quantity: • Adopt an enhanced stormwater management control ordinance that adequately prevents contamination of surface water and groundwater in areas where water resources are vulnerable to climate hazards and in carbonate rock areas.[56] • Adopt a steep slopes ordinance that adequately prevents sediment contamination of surface waters.[57] • Prohibit certain uses and regulates development in the Prime Groundwater Recharge Area and the Wellhead Protection Area.[58, 59, 60] • Ensure sufficient water capacity for new development through capacity evaluation and using the Water Use and Conservation Plan (WUCMP)[61] for the affected watershed(s) to develop appropriate conservation management requirements.[62] • Reduce climate hazard vulnerability for riparian areas and open waters with sufficient buffers where habitat conservation and restoration are promoted or required.[63] • Ensure lake water quality[64] is protected from climate hazard impacts with more stringent stormwater control regulations. • Ensure development proposals and approvals have sufficient water conservation measures in the design and construction of structures and sites.[65] • Adopt a water conservation ordinance to promote prudent use of water.[66]
	N10-N12, N16	Depave impervious surfaces in Wellhead Protection Areas, Open Water Protection Areas, Prime Groundwater Recharge Areas, and Carbonate Rock Areas.

NATURAL SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO **WATER SOURCE RESOURCES**

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	N10-N12, N16, N17	Install and strictly enforce installation of adequate stormwater management in high impervious surface areas, particularly those exposed to climate hazards and steep slopes, that affect wellhead protection areas, open water protection areas, prime groundwater recharge areas, and carbonate rock areas.
	N10-N17	Develop, update, integrate, and implement plans that can coordinate efforts to reduce climate hazard vulnerability of water quality and quantity, such as a: • Stormwater Management Plan[67] • Lake and Stream Management Plan[68] • Water Use and Conservation Management Plan[69] • Watershed Implementation Plan[70] • Green Infrastructure Plan[71] • Hazard Mitigation Plan

NATURAL SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO AIR QUALITY

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	N18, N19	Coordinate with health departments and emergency response to develop a local awareness program to engage residents in voluntary actions to reduce air pollution, including to engage truck drivers, bus operators, and the general public in a "zero-idling" campaign, and to implement a community alert system during conditions of poor air quality.
	N19	Enact and enforce restrictions that prohibit vehicle engine idling.[72]
	N19	To reduce sensitivity of air quality to climate hazards, develop a woodstove certification and changeout program to educate residents on health risks and pollution levels associated with non-certified wood stoves and fireplace inserts and offer incentives to obtain USEPA-certified units.[73]

STRATEGIES TO REDUCE VULNERABILITIES TO PEOPLE

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	S1-S9 Hazards Identification and Characterization	Establish sufficient supports and resources[74] that are not vulnerable to climate hazards to serve the public during natural hazard events, including periods of high temperatures, and that could also potentially provide benefits for socially vulnerable populations during times when there is not a natural hazard event.[75]
	S1, S2, S4-S9	Prioritize public improvements in neighborhoods that have facilities that may introduce adverse health impacts related to air and water quality, particularly those that are located within proximity to socially vulnerable populations or are in overburdened communities. Such facilities include industrial uses, power plants, sites containing hazardous materials, truck depots, and congested or heavily traveled roadways. Install transitional buffer zones, and vegetative screening to address health impacts and reduce exposure. If these facilities or neighborhoods are exposed to current climate hazards, take immediate pre-disaster action to minimize or eliminate the risk to people from a potential natural hazard event. Consider compounding effects of climate hazard exposure in addition to existing exposures and vulnerabilities. Also, collaborate with facility managers, boards of health, and emergency management to establish protocols to aid socially vulnerable populations during a natural hazard event.[76]
	S1-S9	Implement an ongoing public engagement program that ensures meaningful, constructive dialogue with all sectors and populations of the community and solicits direct participation in the planning and decision-making processes. The engagement program will be more successful and have greater impact climate hazard vulnerabilities if it includes thoughtful deliberation of any underlying systemic or other issues the community is experiencing or is concerned about.
	S1, S2, S6	Include information about New Jersey's Flood Disclosure Law, and the associated tool, on the municipal website and in any outreach materials for renters, potentially in multiple languages. The recently adopted law requires landlords to disclose knowledge of a property's history of flooding, flood risk, and location in a flood zone or area on new leases and renewals.
	S1, S6	Update the municipality's Flood Damage Prevention Ordinance[77] and strictly enforce the provisions pertaining to debris, storage, and structures in flood hazard areas, particularly when the material includes hazardous substances. Work with landowners to remove all materials and structures from floodplains and flood hazard areas.

SOCIAL SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO PEOPLE

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	S1, S4-S6, S8, S9	Make zoning and ordinance changes to encourage or require minimum tree cover and cool pavement ratios for development applications in urban heat islands, and minimum porous pavement for flood areas.[78]
	S1, S4-S6, S8, S9	Make zoning and ordinance changes to allow or require passive, energy-efficient strategies such as green and cool roofs to reduce the vulnerability of people to extreme heat and reduce energy demand and water costs.[79]
	S1, S5, S6, S8	Employ cool pavement strategies, prioritizing any areas with socially vulnerable populations, for improvements made to municipal streets, parking areas, sidewalks, playgrounds, and driveways. Cool pavements such as pervious concrete, porous asphalt, and reinforced grass pavements reduce surface temperatures and help to retain and absorb stormwater.
	S3, S5, S7, S8	 Promote and support urban agriculture to reduce the vulnerability of people by ensuring that all people have access to locally grown food and by providing temperature cooling and air quality benefits in urban areas. Locally grown food also reduces vulnerability of natural systems by reducing food miles traveled.
	S6, S7, S8	Educate socially vulnerable property owners about the NJDEP Blue Acres program.
	S1, S21, S6, S8	Pursue the Ready Set GO! Fire Company program in order to establish better communication between the local fire department, the likely first responders for a wildfire event, and local residents and business owners at risk to current and projected wildfire hazard.[80, 81]

STRATEGIES TO REDUCE VULNERABILITIES TO SUSTAINABLE ECONOMIC DEVELOPMENT

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	E2-E4 Hazards Identification and Characterization, Build out and Assessment of Current and Projected Development	Identify and designate appropriate growth areas to invest in economic growth over time as development necessarily shifts away from areas with current and projected climate hazards. Consider participating in the Highlands Transfer of Development Rights Program to shift devel-opment potential toward smart growth in the identified areas.
	E1-E4	Re-evaluate redevelopment and economic development plans to ensure development shifts away from areas with high exposure to spatially-defined current and projected climate hazards, and to ensure any proposed development plan addresses current and projected vulnerabilities to urban heat islands and drought-induced water supply.
	E2-E4, Hazards Identification and Characterization, Build out and Assessment of Current and Projected Development	Make changes to zoning regulations that reduce vulnerability to cur-rent and projected spatially-defined climate hazards.
	E1-E4	Reinforce high-density development that is an essential economic component of municipal revenue and individual livelihoods through floodproofing and raising structures and infrastructure, constructing flood barriers, stabilizing slopes, using wind and fire enhanced design standards in new structures and redevelopment, creating buffers, and conducting prescribed burns in wooded areas. This may trigger an assessment of benefits compared to costs, with consideration of poten-tial damage due to current and projected climate hazards.
	E1, E2	Coordinate housing and transportation plans and development with economic development planning to ensure that there are adequate housing and transportation options[82] for people employed at jobs in the municipality.
	E3	Coordinate economic growth efforts with efforts to create more nat-ural lands and green infrastructure. Rely on natural systems to the extent possible to mitigate climate hazard impacts and ensure areas of economic development do not inadvertently become more vulner-able to climate hazards from new non-residential development or redevelopment.

ECONOMIC SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO **WORKING LANDS**

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	E6	Make changes to zoning that ensure prime and important farmlands are zoned for agriculture and that any development that disturbs the soil is restricted or severely limited on soils that are highly suitable for farming.
	E5, E6	Participate in the Highlands Transfer of Development Rights Program to shift development potential away from agricultural lands into designated growth areas where development would not increase vulnerabilities to climate hazards.[83]
	E7	Promote and support agricultural best practices for soil management by supplying educational resources for farmers and acknowledging accomplishments in sustainable agriculture techniques. For example, leaving fields unplowed following harvesting (i.e. no-till agriculture) maintains soil structure, retains moisture in the soil, and keeps the soil cooler during high temperatures. Organic agriculture promotes biodiversity that may help reduce vulnerabilities to existing and new pests and diseases. Crop rotation reduces the need for chemical application due to soil nutrient depletion or pest outbreaks associated with monoculture farming.
	E5, E7, E8	Provide a program and/or mechanisms for connecting farmers who are experiencing crop or revenue losses, or are otherwise impacted by changing temperature and precipitation patterns or by current or projected climate hazards, with resources such as the Rutgers New Jersey Agricultural Experiment Station (NJAES) Cooperative Extension, to consider various adaptive agriculture strategies.
	E5, E7, E8	Collaborate with landowners to implement habitat restoration of riparian areas on farmland and to coordinate farmland preservation with efforts to reduce the vulnerability of the local and regional farm economy to current and projected climate hazards. In the collaboration, address economic development concerns for agri-tourism businesses, such as municipal policies and regulations regarding signage, building codes, permitting, and parking or other provisions.[84]

ECONOMIC SYSTEM

STRATEGIES TO REDUCE VULNERABILITIES TO **OUTDOOR RECREATION**

Climate-Ready Goals*	CCRHVA/LUPE Output**	Strategy
	E9-E19	Provide a program or mechanism to work with eco- and agri-tourism stakeholders to identify concerns and alternative solutions associated with current and projected climate hazards.
	E9-E19	In collaboration with residents, local business groups, neighboring communities, and local environmental advocates, develop an eco-tourism promotional and branding program that considers economic benefits and promotes natural resource protection and preservation. Collaborate with farmers to incorporate promotion of agri-tourism, public awareness of buying local farm products, and support best practices in soil management on farms.

BACKGROUND INFORMATION

FRAMING RESILIENCE IN ADAPTIVE CAPACITY, ENVIRONMENTAL SUSTAINABILITY, AND SOCIAL EQUITY

POLICY AND LEGAL OVERVIEW

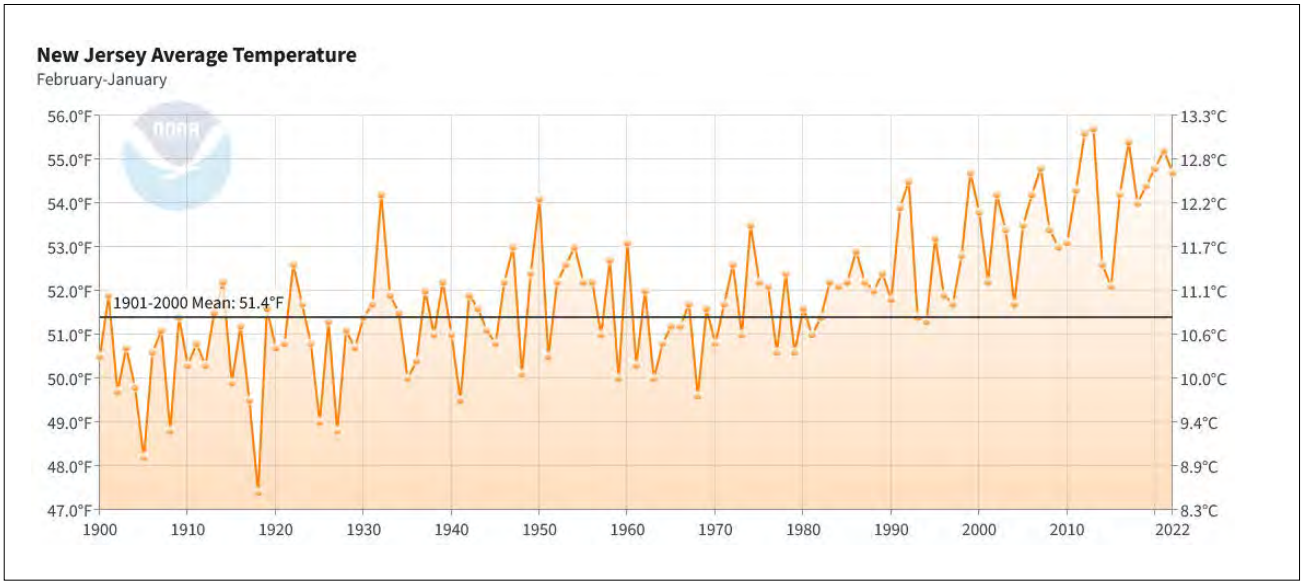
FRAMING RESILIENCE IN ADAPTIVE CAPACITY, ENVIRONMENTAL SUSTAINABILITY, AND SOCIAL EQUITY

PLANNING FOR A CHANGING CLIMATE

Historical conditions are no longer a reliable indicator for planning. Relative to the average annual temperature experienced between the years 1901 and 1960, the average annual temperature in New Jersey is projected to rise 4–5°F or 9–10°F by the end of this century, depending on a moderate or high carbon emissions scenario, respectively. The average has already increased nearly 4°F since 1900 (Figure 6).[85] Within the next 30 years, about 70% of summer seasons in this region are expected to be hotter than the warmest summer on record thus far.[86] The state will also continue to experience increasingly frequent extreme precipitation events coupled with more short-term droughts occurring in between.[87] The mountainous area of the Highlands Region experiences more annual average precipitation than other areas of the state, and the trend of increasing precipitation intensity will be greater in the Highlands Region (Figures 5 and 6). Counties in the region are projected to see between 37–50% increases in rainfall,[88, 89] making flash floods and riverine flooding major concerns for the region.

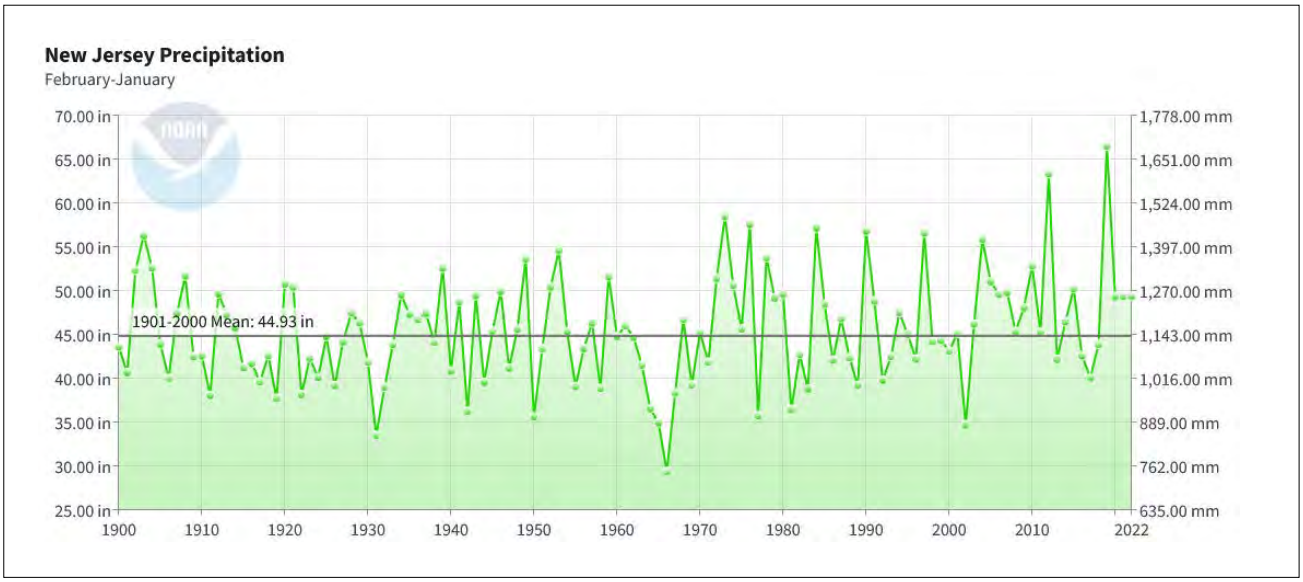
Climate is a function of temperature and precipitation. Climate scientists evaluate these parameters based on data measured over at least 30-year periods. The rapid changes in climates across the globe exhibited over the last several decades have been determined to be the product of human industrial activities that occurred in the previous decades.[90] The impacts resulting from changing

Figure 6. New Jersey Average Temperature from 1900-2022.



NOAA National Centers for Environmental information, Climate at a Glance: Statewide Time Series, published July 2023, retrieved on July 31, 2023 from https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/time-series.

Figure 7. New Jersey Annual Precipitation from 1900-2022.



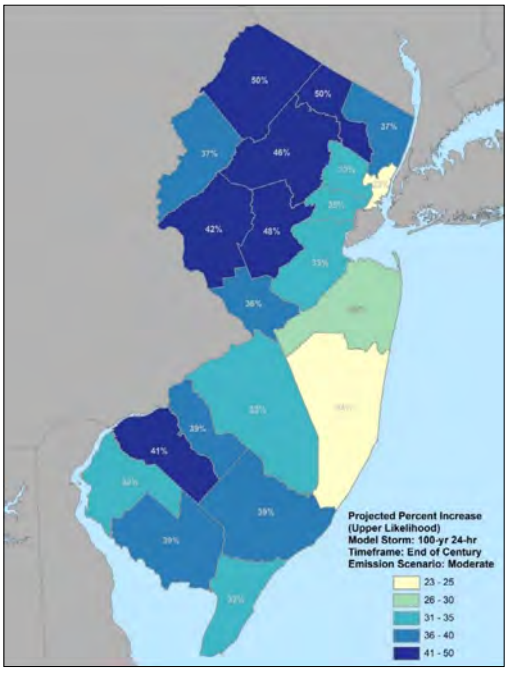
NOAA National Centers for Environmental information, Climate at a Glance: Statewide Time Series, published July 2023, retrieved on July 31, 2023 from https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/time-series.

climate conditions are felt today throughout the sectors that our society depends on and values, and it is anticipated that they will continue for years to come, with their intensities depending on how effectively greenhouse gas emissions are managed.[91] Climate adaptation planning is therefore central to sustaining healthy and thriving communities, and sustainability planning must be grounded in understanding and preparing for climate change-related impacts.

Effective climate **RESILIENCE** supports and strengthens the ability of social and ecological systems to withstand, learn from, and adapt to shocks and stresses resulting from a changing climate. It is an ongoing, dynamic, and iterative effort pursued in collaboration with members of a community and to benefit quality of life for all.

RESILIENCE is 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, pursued through a dynamic, iterative, and ongoing process of learning and changing.

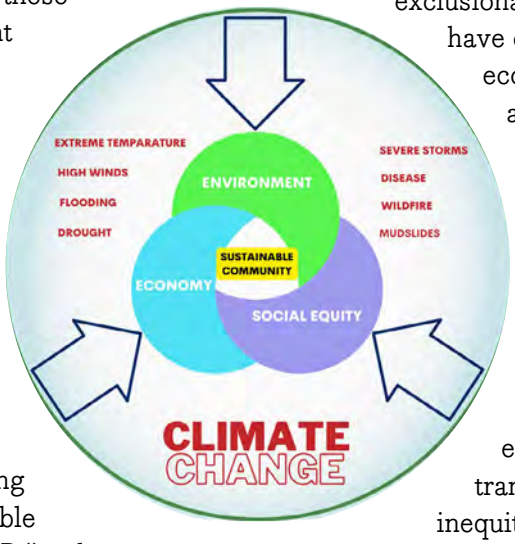
Figure 8. Projected (2050-2099) increase in rainfall amounts (in %) above the 1950-1999 historical period associated with the 100-year, 24-hour storm across New Jersey.



New Jersey 2021 Rainfall Studies Summary. NJDEP.

SUSTAINABILITY PLANNING FOR HEALTHY PLACES AND HEALTHY PEOPLE

Sustainability encompasses environmental health, economic health, and social equity in health and prosperity for people.[92] Each of these three pillars is a vital component of sustainability, and all are interrelated. The relationship between natural resources and livelihoods in the Highlands Region demonstrate that protection of natural resources is linked to local and regional economies.[93] The region is also valued for the cultural connections between people and the unique environment of the region, in addition to its being a vital source of the state's potable water. The 2008 Highlands RMP "seeks to evaluate how best to protect the natural and cultural resources of the Highlands Region while striving to accommodate a sustainable economy."



Since the 1992 United Nations Conference on Environment and Development,[94] health has been a central factor of sustainable development along with the recognition that climate change can have both direct and indirect effects on human health.[95,96] Direct exposure to chemicals, air pollution, extreme heat, or diseases are examples of climate change-related health impacts. Other more distant factors can also impact health, including climate change-related impacts affecting ecosystem degradation, water scarcity, energy access, or waste management.

Sustainability planning is intersectional because environmental sustainability relies on clean, functioning natural ecosystems, which are essential for human health and can only be achieved through effective climate adaptation planning. The relationships are endless, but one thing is clear: human health, environmental health, and climate change are inextricably linked and together should drive community planning frameworks.

Also clear is the need to center equity in community planning processes and decision making. The historic policy of redlining and the practice of exclusionary zoning that continue today have contributed to vast racial and economic disparities within and among many communities.[97,98,99] Impacts on citizens can be multi-faceted, affecting every aspect of life from access to basic needs such as clean air and water, healthy food, and shelter, to higher-level social factors that contribute to health and prosperity, such as education, jobs, housing, and transportation. Exploitative, inequitable practices fuel environmental injustices toward people that lead to environmental degradation and foster vulnerable populations, thwarting any efforts aimed at sustainable development. Resilient and sustainable communities can only be achieved through equitable and just solutions.

SYSTEMS APPROACH TO ADAPTIVE CAPACITY

By embracing an integrated planning approach to sustainability and climate adaptation planning, broader community issues can be addressed at the same time. A tenet of climate resilience is to demonstrate **ADAPTIVE CAPACITY**, which is the ability to address vulnerabilities to climate change through an ongoing, iterative process of learning, building capacity, and adapting.

> **ADAPTIVE CAPACITY** is the extent to which people or systems can learn from and adjust to climate variability and extremes to cope effectively with the changes and uncertainties associated with climate change and address the causes and the impacts of climate hazards.

Given that the concept of sustainability does not presume a static condition and is based on making decisions with the future health of environments and people in mind, it can be framed in terms of a process that maintains the activities that support adaptive learning in the context of changing conditions and information.[100, 101, 102] Woven into that process is the work of capacity building so that the learning can occur and appropriate solutions for advancing sustainability can be implemented. This way of operating is also the approach needed to be **CLIMATE READY** and presents an opportunity to go beyond reactionary actions and to make intentional efforts toward community-based improvements—addressing the issues raised and experienced by those most impacted by environmental or climate change-related factors.

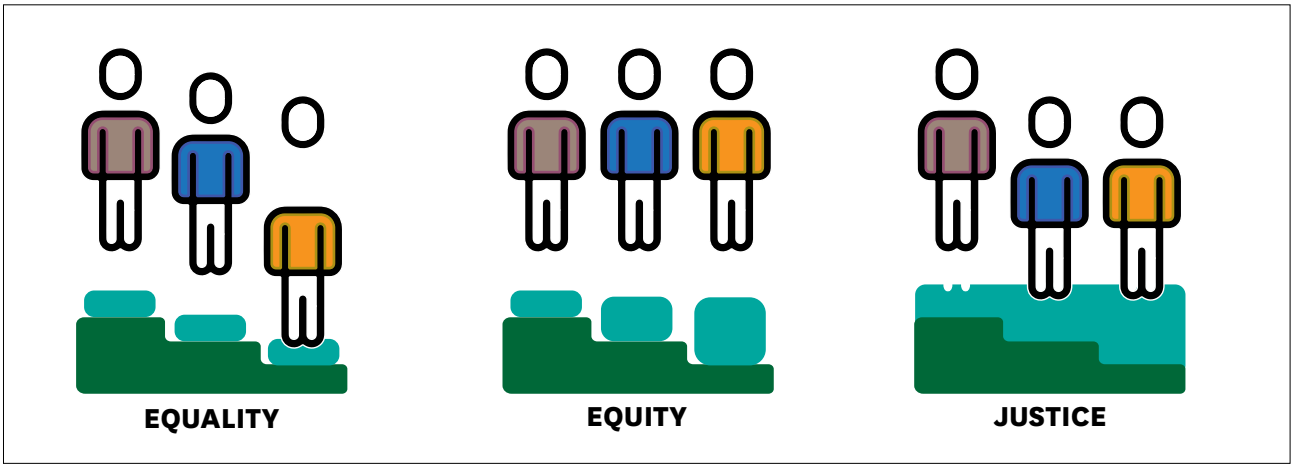
> **CLIMATE READINESS** is the ability of people and systems to iteratively and continuously build capacity to cope with climate change and variability, make proactive decisions informed by climate change-related data, swiftly respond to natural hazard events, and take advantage of opportunities and pursue goals that advance social and environmental sustainability in the context of elimate vulnerability and uncertainties.

Making systemic changes is not easy and requires holistic thinking. A systems approach moves away from siloed actions and focuses on addressing pervasive issues—such as climate change—with the recognition that real-world systems are dynamic, interconnected, and complex. Goals to improve systems can be approached as cohesive units, instead of isolated actions or projects, for more effective processes and outcomes. The systems approach applied in the Model CCRHVA analyzes climate hazard vulnerability for the natural, built, social, economic, and governance systems that support a community. This guidance for Highlands municipalities follows the same framework so that municipalities can readily translate the findings of their CCRHVA into their LUPEs and sustainability goals.

EQUITY THROUGHOUT

The planning process to assess and address environmental and climate change-related conditions in a community is not only a mechanism to apply systems thinking. The process can also inform and address broader social impacts that may exacerbate climate hazard vulnerability for certain populations. Community-based planning grounded in equitable processes, designs, and outcomes is a distinct approach that goes beyond gathering limited public input at perfunctory public meetings or through surveys. It involves an intentional engagement program that begins in the very first phases of exploring and developing an initiative, and continues throughout all phases of the process to ensure

EQUALITY IS NOT THE SAME AS EQUITY, AND ULTIMATE WE'RE STRIVING FOR JUSTICE



Source: Rosenkrantz L. **A renewed attention on environmental equity and justice [blog]**. Vancouver, BC: National Collaborating Centre for Environmental Health, 2022 Dec. 13. Available from: https://ncceh.ca/content/blog/renewed-attention-environmental-equity-and-justice

outcomes and benefits are distributed equitably and that underlying root causes of social disparities are acknowledged and addressed in the process.[103]

Environmental and climate change-related stressors have real impacts on systems that are not only apparent when there is a hazard event but can also create ongoing chronic stresses to populations and communities. It is often those least able to cope with proximate or chronic stresses who are at the most risk from them. Sustainable, climate-ready communities are those that build on the resilience and knowledge of community members, particularly including those disproportionately affected by environmental, climate change-related, or systemic structural impacts to implement equitable solutions.

The municipal comprehensive planning process is the ideal setting to develop the visioning and capacity building to maintain the systems that keep a town healthy and viable for all community members.

POLICY AND LEGAL OVERVIEW

HIGHLANDS REGIONAL PLANNING

Environmental sustainability is at the core of the Highlands Water Protection and Planning Act[104] (Highlands Act) of 2004 and the Highlands Regional Master Plan[105] (RMP) adopted in 2008. The laws[106] promulgated under the Highlands Act seek to protect the Highlands Region's public trust resources through a "comprehensive approach," including the imposition of stringent water and natural resource standards in areas delineated for preservation of natural resources, a reorganization of land use powers to emphasize regional planning for the Highlands Region as a whole, and a "strong and significant commitment of the state to fund the acquisition of exceptional natural resource value lands."

The Highlands Act required creation of the RMP to guide implementation of the act. The RMP aims to protect the natural and cultural resources of the Highlands Region while striving to support a sustainable economy. It establishes the capacity limitations for future growth within the Highlands Region related to both natural systems and the built environment. The RMP evaluates how the features of the region relate to the costs and consequences of local land use planning decisions; assesses the environmental and economic benefits of natural resource and open space protection, particularly as they relate to the quantity and quality of natural water supply; and establishes the tools and methods necessary to institute growth control measures to safeguard critical natural resources.

Municipalities with land designated in the Highlands Preservation Area of the Highlands Region are required by the Highlands Act to demonstrate "plan conformance," a process that brings local planning and regulatory documents into alignment with the goals, policies, and objectives of the RMP. Municipalities that are in the Highlands Planning Area of the Highlands Region are encouraged to align their local plans with the RMP through incentive programs and grant opportunities available to all municipalities in the region. Municipalities that demonstrate plan conformance with the RMP also meet State Planning Commission (SPC) plan endorsement requirements with respect to the New Jersey State Development and Redevelopment Plan.[107]

MUNICIPAL COMPREHENSIVE PLANNING FOR SUSTAINABILITY AND CLIMATE CHANGE

Over the last 15 years, a number of amendments to the MLUL have advanced sustainability and climate change planning. Some of these updates are discretionary, such as the 2008 amendment,[108] which allowed for the development and adoption of a Sustainability Plan Element in a master plan. Other amendments related to environmental sustainability are provisions that apply to all municipalities, such as the amendment from 2009[109] that defined a wind, solar, or photovoltaic technology as an "inherently beneficial use," which is a public good that promotes the general welfare and as such, would qualify for a local land use variance if needed to install one.

More recent amendments from 2016[110] and 2019[111] apply to all municipalities and require a statement of strategy concerning smart growth, storm resilience, environmental sustainability, and electric vehicle charging infrastructure planning when updating the LUPE of a master plan, as well as more detailed planning for electric vehicle charging when updating Circulation or Sustainability Elements.

Most recently in 2021,[112] the MLUL was amended to require any municipality to prepare a "climate change-related hazard vulnerability assessment" when completing or updating the LUPE of a master plan. The climate change-related hazard vulnerability assessment—referred to as CCRHVA in this

guidance—requires the use of the latest science available from the NJDEP to analyze current and future threats and vulnerabilities associated with climate change-related natural hazards in a municipality. The provisions of the 2021 amendment require that the CCRHVA include identification of critical infrastructure, a build-out analysis, and strategies and design standards to reduce risks associated with natural hazards. In addition, the amendment requires that the CCRHVA analyze impacts on the master plan and provide a policy statement on the relationship with certain other plans.[113]

STATE LAWS AND POLICIES

Additional laws and policies that impact the municipal approach to land-use planning include the state's 2020 "environmental justice law," 2020 changes to the SPC municipal plan endorsement process, 2021 "electric vehicle supply equipment law," 2021 State of New Jersey Climate Change Resilience Strategy, updated flood and stormwater ordinances, rule changes based on NJDEP's NJ PACT (New Jersey Protecting Against Climate Threats) project to institute climate change-related regulatory reforms, and updates to federal policy regarding state and local hazard mitigation planning. Each of these initiatives sets the stage for action on the part of state as well as local jurisdictions, as described below.

2020 Environmental Justice Law

As municipalities undertake climate change planning, they have opportunities to address social, economic, and environmental inequities. The state-level approach heralded in the state's 2020 Environmental Justice Law[114] declares that no community should bear a disproportionate share of the adverse environmental and public health consequences that accompany the state's economic growth. The law also states that overburdened communities must have a meaningful opportunity to participate in local land use decisions regarding certain types of facilities which may cause a potential increase in environmental stressors. As such, the law establishes enhanced requirements for these types of facilities, especially regarding outreach to overburdened communities in the case of permit applications. The Environmental Justice Rules were published in April 2023 to enforce the law.[115]

2020 Amended State Plan Endorsement Process

New Jersey amended the guidelines in 2020 for the SPC plan endorsement[116] process for municipalities seeking to voluntarily demonstrate their coordination with the goals and policies of the New Jersey State Planning Act.[117] The amended guidelines outline a three-step process for communities to demonstrate their climate change planning, which includes conducting a CCRHVA and developing a local resilience strategy. The assessment should include, at a minimum, analysis of areas within the municipality that are subject to exposure to three, five, and seven feet of sea-level rise and the 1% (100-year) and 0.2% (500-year) storms, in order to assess flood risk.

2021 Electric Vehicle Supply Equipment Law

In 2019 New Jersey unveiled the state's energy master plan[118] to outline strategies to reach the goal of 100% clean energy by 2050. This was borne out of the state's 2007 Global Warming Response Act mandate of reducing state greenhouse gas emissions by 80% below 2006 levels by 2050—known as the 80x50 goal. A 2020 NJDEP report evaluated the state's progress and identified pathways toward reaching the 80% reduction by 2050.[119] The state's commitment to a shifting away from energy production that contributes to climate change has resulted in the development of additional actions directed at municipalities, including the 2021 law[120] establishing that electric vehicle charging infrastructure is an inherently beneficial use, pursuant to the MLUL, and that electric vehicle supply equipment (EVSE) is a permitted accessory use (and structure) in all zoning or use districts throughout New Jersey. The law also established associated installation and parking requirements for EVSE in all of New Jersey's municipalities. In order to implement the law, the New Jersey Department of Community Affairs (DCA) published a statewide model EVSE ordinance[121] for adoption by municipalities.

To also support local implementation of the state's energy master plan, the New Jersey Board of Public Utilities developed the Community Energy Plan Grant Program[122] to help align local efforts and implement emissions-reducing initiatives.

2021 State of New Jersey Climate Change Resilience Strategy

The state's overall direction for local climate adaptation is outlined in New Jersey's first statewide climate change resilience strategy. Released by NJDEP in 2021, the State of New Jersey Climate Change Resilience Strategy[123] includes strategies and actions to promote the long-term mitigation, adaptation, and resilience of New Jersey's economy, communities, infrastructure, and natural resources. The strategy will also guide the state's actions in reforming climate change-related regulations, policies, and programs affecting municipalities. Building off the New Jersey Climate Resilience Strategy, and to achieve the reduction measures found in the 80 x 50 goal, NJDEP and the New Jersey Department of Agriculture are developing a Natural and Working Lands Strategy[124] to outline land protection, restoration, and management strategies for carbon sequestration. The Strategy, due for release in 2024, recognizes that forest, agricultural lands, wetlands, developed lands, and aquatic resources and habitats are critical to storage and reduction of greenhouse warming gasses.

Flood and Stormwater Ordinance Updates

The Federal Emergency Management Agency (FEMA) recently conducted a review of New Jersey's model flood damage prevention ordinances for conformance with the National Flood Insurance Program (NFIP) regulations. It was determined that the model ordinances provided by NJDEP were not consistent with NFIP compliance requirements. Municipalities must comply with NFIP regulations to participate in the NFIP program that provides flood insurance to property owners. It was also found that better coordination is needed between the three sets of regulations that control development and construction in the floodplain, and specifically, that development was occurring in some communities that did not meet statewide minimum standards required by 44 CFR 60.1(d),[125] which include nonstructural development such as filling, grading, excavations, fences, pools, temporary structures, and other examples. The New Jersey Model Code Coordinated Ordinance[126] coordinates regulations of: a) the NFIP, which is implemented by local floodplain administrators; b) the New Jersey Flood Hazard Area Control Act, which is implemented at the state level by the NJDEP; and c) the Uniform Construction Code, which is implemented at the local level by local construction officials. There are two versions of the ordinance—one for riverine areas, the other for coastal communities.

An amendment to the state Stormwater Management Rule[127] took effect in 2021 that requires the use of green infrastructure in major development projects. The new rule requires decentralized, distributed stormwater management practices that enable stormwater to infiltrate on site and more closely resemble the natural water cycle. The rule details "best management practices" (BMPs) that include vegetated swales, bioretention, green roofs, cisterns, wet ponds, infiltration basins, and constructed wetlands. In July 2023, additional changes to the Stormwater Management Rule were made as part of the NJ PACT program described below. These additional changes require the use of updated methods for calculating stormwater in the design and construction of stormwater management infrastructure and that stormwater systems manage runoff based on today's storms as well as projected future storms. Municipalities must update local ordinances to ensure they are enforcing the requirements of the Stormwater Management Rule.

NJ PACT Rules

In response to 2020 Executive Order No. 100,[128] NJDEP issued Administrative Order No. 1,[129] which requires the initiation of a regulatory reform effort to integrate climate change considerations into NJDEP regulatory and permitting programs, including, but not limited to, land use permitting, water

supply, stormwater and wastewater permitting and planning, air quality, and solid waste and site remediation permitting. These reforms are incorporated into the NJDEP initiative, "New Jersey Protecting Against Climate Threats" (NJ PACT), which is a program the NJDEP characterizes as a "partnership with New Jerseyans to help both stave off the worst impacts of climate change and adapt to unavoidable impacts already occurring across the state." A main component of the Inland Flood Protection Rule adopted in July 2023 through the NJ PACT program establishes design elevations for certain new and substantially reconstructed developments in inland riverine areas, although it does not prohibit development in these areas. According to the rule, the elevation of habitable first floors will be two feet higher than currently indicated on DEP state flood maps, and three feet higher than indicated on Federal Emergency Management Agency (FEMA) maps. Additionally, applicants for certain permits will use NJDEP's New Jersey-specific precipitation data when calculating peak flow rates of streams and rivers for permits under the Flood Hazard Area Control Act Rules,[130] as well as when proposed development triggers compliance with DEP's Stormwater Management Rule, which is described above.

INTERSECTING PLANNING EFFORTS

Hazard Mitigation Planning

In 2022, FEMA made policy updates to the Local Mitigation Planning Policy Guide,[131] which interprets the requirements in the Robert T. Stafford Disaster Relief and Emergency Assistance Act[132] and Title 44 Code of Federal Regulations Section 201-Mitigation Planning.[133] Among other changes, local governments are required to include the "effects of climate change and other future conditions" in the risk assessments of their hazard mitigation plans. The updated policies became effective in April 2023. Municipalities typically participate in the development of a Multi-Jurisdictional Hazard Mitigation Plan (HMP) prepared by the county, which allows each participating municipality to qualify for FEMA mitigation grants. Some municipalities may also prepare their own independent HMP.

Open Space Planning

Under the banner of OutsideTogether!, NJDEP completed New Jersey's Statewide Comprehensive Outdoors Recreation Plan in December of 2023. The Statewide Comprehensive Outdoor Recreation Plan had traditionally focused on recreation, and in this update, NJDEP expanded its focus to include the equitable delivery of open space. As the state's open space plan, it will ensure continued access to federal and water conservation funds that are used to protect land and add to state parks, forests, and wildlife management area systems. The plan lays out a vision statement and guidance document for outdoor recreation and land conservation endeavors for the state. Several principles of this planning effort align with climate adaptation planning in the Highlands, including: "Empowering communities through investment in ecotourism and outdoor recreation; furthering equity and environmental justice through outdoor recreation, and continuing the commitment to stewardship and the conservation and restoration of biodiversity." Plan objectives, such as "Enhance the focus on the economic benefits of preservation, including those associated with climate resilience and sustainability, ecotourism, and biodiversity," highlight how Highlands communities can advance similar approaches as they develop local open space plans to support climate adaptation.

APPENDIX

INCLUSIVE COMMUNITY ENGAGEMENT FOR LOCAL CLIMATE AND SUSTAINABILITY PLANNING

The following pages are an excerpt from "Climate Planning Research Review: A Summary Report to the Highlands Council from the New Jersey Future Team for the Highlands Resilience Project" that was developed based on research conducted to complete this guidance document.

I. Inclusive Community Engagement for Local Climate and Sustainability Planning

II.

Guidance and information for engaging communities around climate and sustainability planning were reviewed based on a web search of literature and gray literature sources. Findings generally describe the following key considerations and are described in more detail in the annotated bibliography that follows. Examples of worksheets and direct guidance were also identified in the reviewed materials and are described on the following pages.

KEY CONSIDERATIONS FOR INCLUSIVE COMMUNITY ENGAGEMENT

- Do "pre-planning" specifically to engage the community at the start of the planning process.
- Foster trust through culturally aware messaging, transparency in process and goals, and listening to and applying the expertise of the community members. There often exists a culture of mistrust of government or planning initiatives by community members who have not benefited from the distributional outcomes of resources and benefits, or have experienced negative impacts.
- Adopt a learning posture throughout the planning process.
- Implement intentional conversations and actions to address the root causes of racial and economic disparities throughout the planning process and in development of solutions.
- Shift the planning process and decision-making framework to center on those in the community who are disproportionately impacted by climate and environmental impacts.
- Solutions and strategies should not only address climate or environmental issues. They should also improve conditions or structures that have created or are creating disparities in the community.
- Build capacity to maintain an ongoing and iterative engagement process and practice equitable governance.

Description of Reviewed Resources and Documents Outlined in an Annotated Bibliography

Cafer, Anne, Green J. & Goreham, G. (2019). *A Community Resilience Framework for Community Development Practitioners Building Equity and Adaptive Capacity*. Community Development, 50:2, p. 201-216.

This research paper identifies four critical concerns in the current community resilience literature and develops a community resilience framework by combining the "Sustainability Livelihoods Approach" with the "Community Capitals Framework." The approach focuses on the assets of the community and community development practice to engage communities, inform policy, and build resilience.

Campbell, Nnenia (2021). *Principles of Risk Worksheets: Exercises for Integrating Principles into Risk Communication Practice*. Boulder, CO: Natural Hazards Center, University of Colorado Boulder.

This booklet provides worksheets with questions to help ensure considerations and actions on the part of practitioners managing risks from floods and related natural hazards are incorporated into effective risk communication to reach populations that tend to experience disproportionately negative impacts from disasters. The three core principles of risk communication identified in the guidance are:

- Communicate Through Familiar and Trusted Messengers
- Provide Clear, Actionable Information
- Tailor Messages and Information Pathways for Target Audiences

Centers for Disease Control and Prevention (2021). *ATSDR CE Playbook Index.* Agency for Toxic Substances and Disease Registry.

This guidebook was developed for public health professionals and state, territorial, local, and tribal partners to "work collaboratively with and through groups of people to address [environmental contamination] issues that affect the group's well-being" through all phases of community engagement. Key points made are that:

- There is a need to collaborate with existing community groups and other partners to meet the various needs of a community or community engagement process.
- There may be distrust in the community.
- There is a need to understand a community's perceptions, history, needs, and challenges in order to find opportunities to work with the community on addressing their issues or meeting their needs.

The document provides a series of questions for the practitioner for each phase of the engagement process that is generally informative for approaching communities that have experienced disproportionately negative impacts through intersecting environmental and social factors. It also provides high-level instruction on how to perform community engagement activities, including:

- Developing a Community Profile

- Identifying Stakeholders
- Developing a Community Engagement Plan with SMART Objectives
- Gathering and Sharing Information
- Maintaining Collaboration and Communication with Community Stakeholders
- Identifying Communications Channels and Developing Communication Materials
- Planning and Conducting Education for Community Members
- Evaluation of Community Engagement Activities

Gonzalez, Rosa (2020). *Community-Driven Climate Resilience Planning: A Framework, Version 2.0*. National Association of Climate Resilience Planners.

This framework describes how the process of resilience planning can be more effective by centering vulnerable populations in the process and considers community-driven resilience planning to be complementary to public sector planning. Resilience planning requires the capacity to act on a vision and set of priorities, evaluate community vulnerabilities and assets, and enhance community representation and power in resilience decision making.

The shifts in governance the framework expects involve integrating climate mitigation and adaptation strategies, shifts to support a systems approach, and building human capital. Recognizing the complexities in "adding voices" to decision making processes, the framework outlines the need for the following fundamental shifts in governance:

Community-Driven Resilience Planning

"the process by which residents of vulnerable and impacted communities define for themselves the complex climate challenges they face, and the climate solutions most relevant to their unique assets and threats."

- Improved infrastructure for community participation in decision-making
- Authentic and equitable partnerships between local government and community-based organizations that bring expertise and capacity to build community leadership and facilitate the development and implementation of community-driven climate resilience solutions
- Increased awareness of structural racism and other systemic issues contributing to disproportionate climate impacts
- More comprehensive solution sets that address the root causes of climate vulnerability
- Increased communication, coordination, and collaboration across governmental agencies for effective disaster preparedness and for implementation of policy and systems

The guide is intended for community groups to play a fundamental role in building leadership among residents to fill gaps left by conventional governance structures, with appreciation of the genuine expertise that community members have about their assets and vulnerabilities. The guiding principles outlined in the guide include:

- Whole systems thinking
- Desired outcomes [of equity, democracy, health, and wellness] reflected at every step

- Planning processes as learning processes
- Planning into action
- Balancing power dynamics among stakeholders

The guide provides lists of specific activities, resources, outcomes, and examples for the interconnected components of community-driven planning that are essential to the framework. The essential components are as follows:

- Co-development of a planning model in a pre-planning phase
- Power building among the community to widely distribute civic responsibility and leadership
- Visioning for defining the goals of the plan and building support, ownership, and commitment
- Problem definition through shared analysis
- Assessing community vulnerability and assets through participatory engagement
- Solutions development to transform existing systems and build new climate resilience civic and economic infrastructure
- Interventions to keep public planning processes "on track" to climate resilience

The guide also describes emerging opportunities to advance the scaling of climate solutions to support communities by:

- Communicating a climate resilience narrative to build momentum for change;
- Building a new economy and community-based financing;
- Deepening democracy and improving governance; and
- Activating ecological and cultural wisdom.

Herb, J., & Auermuller, L. (2020). *A Seat at the Table: Integrating the Needs and Challenges of Underrepresented and Socially Vulnerable Populations into Coastal Hazards Planning in New Jersey.* [Prepared for the New Jersey Department of Environmental Protection. New Brunswick, NJ].

Completed for the New Jersey Coastal Zone Management Program of the New Jersey Department of Environmental Protection, the report summarizes a project conducted to:

- "Update and enhance access to data that can be used by practitioners to identify socially vulnerable populations as part of coastal community climate resilience planning;
- Develop guidance in the form of a web-based training curriculum to inform and support practitioners' efforts to engage socially vulnerable populations as part of coastal community climate resilience planning; and
- Offer options for changes in coastal management policies that will support engagement of socially vulnerable populations in coastal climate resilience planning."

Although the project and report are focused on coastal communities, the lessons learned regarding impacts of changing climate-related coastal hazards on socially vulnerable populations and potential opportunities for engagement with those populations in local resilience planning and implementation efforts can be instructive to non-coastal areas. This project also generated a "whole-community" themed web-based training for community-based climate resilience planners to enhance

their efforts to proactively involve socially vulnerable populations in resilience planning efforts and assess outcomes of resilience actions on these populations and communities.

For socially vulnerable populations, challenges due to underlying social inequities produce immediate negative effects, making those underlying causes the greatest barrier to achieving resilience. The report makes the case that coastal resilience planning that aims to improve outcomes for socially vulnerable and underrepresented populations must tackle the underlying social, economic, and physical challenges affecting those populations, and in doing so, will make the entire community more resilient and able to "bounce forward" toward improvement from the pre-disaster baseline. In other words, resilience planning centered around vulnerable populations can lead to better outcomes for the community as a whole. Furthermore, the report makes clear that assessment of the impacts of resilience strategies on vulnerable populations is needed in addition to direct engagement. A literature review for the project included in the report identifies four key recommendations related to successful engagement of "populations who face barriers to active participation in community-wide planning:"

One report finding that serves as a foundational concept in equitable resilience planning is that populations and individuals already experiencing inequalities and stressors will experience the impacts of climate change more acutely, making them more vulnerable to further inequality and stress.

- Work with local sources who are trusted by the target population
- Build relationships with communities from the very beginning
- Craft a message that resonates with and is specific to the population
- Make engagement meaningful and worthwhile to the population

The literature review also highlights best practices for the engagement of socially vulnerable populations: how best to reach under-represented communities, how to best craft messages and narratives, and how to make engagement meaningful for the community. These may also be key themes for community engagement in general.

Informants in the process of developing the report convey that municipalities should coordinate with local agencies already providing community supports to communicate and engage with vulnerable populations. Suggestions were also made that municipalities should enhance the following: infrastructure, community centers, emergency services and planning, communication and information distribution, hazards education in the community, and autonomy of individuals to take care of themselves. Suggestions for effective engagement include better outreach strategies designed to be appealing and relevant to the audience; more diverse opportunities for input that include digital, non-digital, or multi-language approaches; leverage of existing trusted organizations for engagement and communication; and not overlooking hard-to-reach or isolated populations.

Institute for Local Government. *Inclusive Public Engagement*. TIERS Public Engagement Framework. Accessed 10 Aug 2022.

The Institute for Local Government is an organization that provides local government leaders with resources and best practices to understand issues, build capacity, and foster trust in their communities. Among other topic areas, they assist with climate action, land use planning, health and environmental issues, and inclusive public engagement. Based on the TIERS Public Engagement Framework (with the 5 pillars of: Think, Initiate, Engage, Review, & Shift), the group advises local governments on how to engage more effectively with and achieve authentic full participation in their communities. The program and guidance are based on the needs of California localities but are generally applicable to local governments elsewhere.

The framework is intended to be a companion to the TIERS Learning Lab program that provides step-by-step instruction to participants. It provides templates and resources for each of the 5 pillars to go through the following process, with reality checks throughout:

- Self-assessment
- Consideration of public engagement approaches
- Consideration of the community landscape
- Drafting a public engagement approach and outreach plan
- Implementing the outreach plan and engagement approach
- Evaluation and review of the plan and approach
- Consideration and implementation of organizational, community, and policy shifts

Metropolitan Area Planning Council (2016). *Community Engagement Guide.*

This guide provides a framework for implementing the activities of local community engagement for place-based projects. It was created for municipal staff in the metropolitan Boston area, but its content transferable across different regions. In brief and direct language, it walks practitioners through the following steps for creating and implementing a community engagement strategy:

- Purpose of Engagement
- Stakeholders
- Resources, Opportunities & Scale of Engagement
- Messaging
- Approach
- Implementation & Modification
- Finalizing & Follow Up

Best practices are also provided for high-level tips and tools, "meeting stakeholders where they are," working with community groups, creative activities and icebreakers, types of meetings, and connecting with youth. Case studies are included to provide real-life examples.

Ross, Lynn, et. al. (2019). *Planning for Equity Policy Guide*. American Planning Association.

This guide places planners – who are often the first line of contact with the community in projects involving community design – in a position to operationalize equity. It provides a historical narrative

demonstrating the role planners have played in creating disparities that lead to disproportionate impacts on segments of the population, and highlights the ethical responsibilities that should guide planners' work. It presents a framework of "equity in all policies" so that the policies and regulations proposed by planners help to reduce or eliminate inequity and benefit all members of a community. Gentrification, environmental justice, and community engagement and empowerment are cross-cutting issues throughout the guide. Climate change is among several topics considered through an "equity lens" in the guide.

In describing community engagement and empowerment, the document's authors recognize that the neighborhood voices typically relied on and empowered by cities to provide community input have been "dominated by single-family home owners who are often predominantly white and above median income." This unbalanced power structure leads to unequal distribution of resources and benefits across communities, with higher-income neighborhoods being favored. It describes exemplary efforts in certain cities and academic recommendations to broaden or change engagement structures in order to give those historically disenfranchised a voice "in both the procedural and substantive decision-making processes." It makes the point that "these new engagement strategies must be connected to and affect local investments, zoning changes, and development approvals" in order to make a substantial difference. To improve the community engagement process, the guide provides the following policy recommendations:

- Institute Principles of Effective Community Engagement and Use Targeted Community-Specific Strategies
- Implement Principles of Participatory Planning
- Build Trust Through Outreach
- Create Space to Listen and Heal Old Wounds
- Avoid Duplication of Engagement Efforts

The section of the guide focusing "Equity in All Policies" on climate change and resilience charges the planning profession with addressing the "root causes, social factors, and biological factors that may influence sensitivity to climate change" and promoting the Urban Sustainability Directors Network's approach of enhancing climate preparedness and resilience through an inclusive, community-centered planning process. This is contrasted with the notion of adapting and surviving chronic stresses or acute shocks. The vision is to advance "sustainable development and poverty reduction amidst climate change."

It "is imperative that planners aim beyond the concept of resilience to achieve climate equity."

The guide provides the following policy recommendations for advancing social equity and social justice in the context of climate change adaptation and mitigation efforts:

- Partner with communities to exchange information about community risks
- Empower communities through community-based participatory planning
- Fund adaptation and mitigation projects identified by communities in community-based recovery and resiliency plans

- Prioritize equitable procurement of planning services that build the capacities of disadvantaged, minority-owned, and women-owned firms and planners of all protected classes in climate change adaptation and mitigation projects
- Consider social equity in all climate change adaptation and mitigation decisions
- Include equity as a consideration in benefit-cost analyses

There are also policy recommendations in the areas of education and energy and resource consumption, health equity, heritage preservation, housing, mobility and transportation, and public spaces and places. These recommendations can also inform sustainability and climate planning and implementation efforts.

An accompanying webinar described development of the comprehensive plan in Charlotte, NC, which incorporated the equity policies with data driven information and intentional community engagement.

Rudolph, L., Harrison, C., Buckley, L. & North, S. (2018). *Climate Change, Health, and Equity: A Guide for Local Health Departments*. Oakland, CA and Washington D.C., Public Health Institute and American Public Health Association.

This document places climate change as a public health threat, recognizes the intersection between addressing climate impacts and improving public health, and puts the elimination of health disparities at the center of implementing climate solutions. It provides a resource for local health departments to see their role in supporting systems change to address determinants leading to disparities in health outcomes and includes a section with high-level recommendations for what local health departments can do to advance health equity and climate resilience within their current programs, with specific focus on eight climate impacts:

"The complexity of equity-first adaptation at the local level requires flexible, scalable, and multi-level frameworks that can be guided by regional adaptation planning initiatives."

- Extreme heat
- Drought
- Wildfires
- Air quality
- Allergens
- Sea level rise
- Storms and flooding
- Nutrition and food security

It also outlines the health benefits of climate action in different sectors and describes intersections of climate change with public health programs, functions, and communications.

San Diego Regional Climate Collaborative at the University of San Diego (2021). *An Equity-First Approach to Climate Adaptation*.

With findings to indicate that adaptation-focused planning documents in the San Diego region were mainly reactive in response to climate change and lacked details on how to approach an economic assessment and how to integrate equity, the San Diego Regional Climate Collaborative at the University of San Diego and the San Diego Association of Governments (SANDAG) developed this guidance document for designing, planning, and implementing a climate adaptation process that supports equitable outcomes, along with an equity curriculum, prioritization tools, and an implementation toolkit for planning professionals in the region.

The approach is based on the foundation that there are "disproportionate impacts of climate change on individuals due to factors such as disparities in income and wealth, access to resources, representation in government, health status, age, neighborhood conditions, indigeneity, citizenship, structural racism, and gender."

The document also recognizes the importance of climate planning at the regional scale to help coordinate fragmented local efforts. Disproportionate impacts of climate change include both the short-term shocks and long-term stressors experienced. The document includes a crosswalk of climate impacts for the region and equity implications, as well as a snapshot of direct community and infrastructure impacts and potential strategies.

The guidance document integrates equity actions into each of the four phases of the California Adaptation Planning Guide by adding a "Phase 0" to implement the "equity-first" framework. Phase 0 is initially applied in a "pre-planning" context and then continued throughout the process from engagement to implementation and evaluation.

Key tenets of the approach include:

- The overarching goal is to enhance access to sustain wellbeing and create the opportunity for improvement.
- Vulnerable communities have existing social capital, networks, and adaptation strategies.
- Supporting the existing work of communities can enhance their resilience.
- It is important to identify the underlying mechanisms of persistent inequality, and adaptation includes deliberate, fundamental change to systems and conditions that produce vulnerability.
- It is essential to recognize the relationship between greenhouse gas (GHG) emissions and climate impacts.
- Environmental privilege involves decision-making about land use and the built environment. Benefits and burdens have been distributed across space, shaped by historical context and ongoing political, economic, and cultural power structures.
- There is an emphasis on learning throughout all phases of the process.

To implement the equity-first approach, the document describes four dimensions of equity (procedural, structural, distributive, and interactional) and how to intersect them with climate adaptation processes. It involves a series of "pre-planning" questions for community groups and stakeholders about climate equity impacts, community engagement, and opportunities and a set of questions for practitioners in the community to address opportunities for organizational capacity building and community capacity building.

A section of the document provides guidance on delivering inclusive community outreach, engagement, and education for diverse audiences. Additional resources, tools, and frameworks are provided in an appendix. The recommendation is to engage with communities before adaptation planning formally begins so that the considerations gleaned from the process can directly inform the planning process from start to finish. The guidance document provides practitioners with "core questions and considerations that should be utilized to guide the process of establishing and fostering long-term, equitable outreach, and engagement" to be used throughout the entire planning process. It also provides key recommendations for equitable stakeholdering and practitioner learning during this pre-planning phase.

For each of the four formal phases of the planning process, this guide provides a set of practitioner questions to help ensure an equitable approach is being applied throughout the planning process and guidance on how to use equity indicators and metrics across phases 0-4. It also contains a chapter dedicated to transportation because of its importance in adaptation and mitigation planning.

Yuen, T., et al. (2017). *Guide to Equitable, Community-Driven Climate Preparedness Planning*. Urban Sustainability Directors Network.

This guide is intended to help local governments design and implement a community-driven, equitable climate preparedness planning process. Equity is made central to the framework through the focus on addressing the root causes of disproportionate risk and identifying equitable adaptation solutions. The guide provides information about factors that can contribute to increased climate risk for individuals or lead to disparities in negative impacts or benefits across a community. It outlines increased sensitivity to climate change in terms of root causes, social factors, and biological factors.

In providing background information, this guide gives an overview of how institutions – particularly governments – perpetuate or exacerbate racial and social inequities by supporting the structural systems that instill and uphold those biases and discriminatory practices. It focuses on the roles of structural racism and institutional racism as policy determinants and drivers of decision-making that affects every aspect of people's lives. Examples are provided to demonstrate operationalization of equitable frameworks for decision making.

In addressing solutions, the guide describes three objectives of equity: 1) procedural, 2) distributional, and 3) structural—each requiring distinct strategies. In the guide's "Framework for Institutionalization of Racial Equity," normalizing, organizing, and operationalizing are described as key tactics for advancing equity within government.

A main component of the guide is the "Equitable, Community-Driven Climate Preparedness Planning Framework," which centers community engagement in the process and aims "to empower the communities experiencing the greatest climate-related risks to co-define the most appropriate solutions." It is designed to be flexible and implemented based on the unique circumstances of any particular jurisdiction and at any point in the climate planning process. The guide is designed to implement solutions to advance each equity objective in the following ways:

- "**Procedural equity** is accomplished in the Framework through community engagement, shared decision making, and transparency in government processes.
- **Distributional equity** is achieved by ensuring that the plan reflects community concerns and priorities and that there are mechanisms in place to review and monitor the implementation of actions.
- **Structural equity** occurs by taking a whole government approach to addressing social inequities, changing organizational norms around racial equity, and instituting other transformative actions, such as normalizing and operationalizing racial equity within government processes."

> *"Solutions designed to build community resilience through hazard preparedness and climate change adaptation, and by reducing social inequities, should be pursued concurrently."*

To describe the framework, the guide compares conventional planning processes with additional or alternative approaches to incorporate the framework throughout. It provides an extensive table of practical process steps, example activities, and resources local government planners can use to center a climate preparedness process on equity for each step of the planning and implementation process.

The guide also includes a section describing climate solutions that will help to address the root causes of disparities in communities resulting from government policies and decisions, an approach which, the guide points out, can make the efforts that address climate impacts more successful. For the climate hazards of extreme heat, urban and coastal flooding, wildfires and air quality, and rising utility and food costs, the guide describes equity considerations for each of several typical adaptation strategies to address them.

Yuen, Tina & Nguyen, J. (2020). *The Planner's Playbook: A Community-Centered Approach to Improving Health & Equity*. Change Lab Solutions.

This guidance document recognizes the role planners and policymakers have played in creating and perpetuating inequities in communities, through both the planning processes and the resulting written plans themselves. It provides a new set of tools for planners, decisionmakers, and other practitioners to center equity in their planning practice and work through a process of unlearning misperceptions and biases. The guidance provides a narrative that recognizes the cause of today's inequities to be directly related to the legacy of discriminatory laws, policies, and practices rooted in the following five fundamental drivers of health inequity:

- Structural discrimination

- Income inequality and poverty
- Disparities in opportunity
- Disparities in political power
- Governance that limits meaningful participation

It describes the typical planning process of assessment, visioning, developing a plan, and implementation of the plan and describes where it falls short of equitable planning. The "pitfalls" identified in the typical planning process fall into the three intersecting and overlapping categories of procedural inequity, structural inequity, and distributional inequity.

Procedural inequity involves ineffective engagement practices that lead to unfair decision making due to a lack of transparency, accessibility, fairness, and inclusion. It is essentially an error of omission, as key voices are left out of the data collection process. Not only do these plans not address the issues of omitted populations or groups, but they also disproportionately promote the interests of those with "established power and influence," serving to reinforce structural inequities in the community and further erode trust.

Structural inequity results from embedded practices and policies that "cause governments and institutions to act unfairly" due to the lack of internal protocols, policies, and capacity to operationalize equity. Distributional inequity is defined as the "unfair distribution of resources, community, burdens, or benefits" resulting from planning policies. The disparities in distribution across neighborhoods contributes to patterns of segregation and disparities in health outcomes.

Tools include a chart for increasing community participation to move through stages from informing the community to empowering the community and best practices for inclusive community engagement strategies.

Three-pronged approach to accomplishing an equitable planning process:

Center the participation and input of priority populations in the planning process. This involves acknowledging and learning from past actions, building trust, and centering inclusive participation throughout the process.

Build capacity and partnerships across government institutions and community stakeholders. This involves sustaining ongoing practices to change norms and work across departments and silos to dedicate time and resources not only during projects, but also leading up to and after planning processes. It also involves two-directional learning to understand and support trauma-informed community strategies and the community's understanding of planning processes.

Apply an equity approach to each phase of the planning process. This involves various strategies, data, and actions at each planning stage.

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The Highlands Water Protection and Planning Council (Highlands Council) is a regional planning agency that works in partnership with municipalities and counties in the Highlands Region to encourage a comprehensive regional approach to implementing the 2004 Highlands Water Protection and Planning Act.

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THE NEW JERSEY FUTURE TEAM:

New Jersey Future is a nonprofit, nonpartisan organization that promotes sensible and equitable growth, redevelopment, and infrastructure investments to foster healthy, strong, resilient communities; protect natural lands and waterways; increase transportation choices beyond cars; provide access to safe, affordable, and aging-friendly neighborhoods; and fuel a strong economy for everyone. New Jersey Future does this through original research, innovative policy development, coalition-building, advocacy, and hands-on strategic assistance. Embracing differences and advancing fairness is central to New Jersey Future's mission and operations. New Jersey Future is firmly committed to pursuing greater justice, equity, diversity, and inclusion through its programs, internal operations, and external communications.

Sustainable Jersey is a nonprofit organization founded as a collaborative with New Jersey State Agencies and the New Jersey League of Municipalities. The Program is implemented through a cooperative agreement with The College of New Jersey (TCNJ) which is an instrumentality of the State of New Jersey. We are a network of municipalities and schools working collectively to bring about a sustainable future. Sustainable Jersey develops best practices and tools andprovides resources to help municipalities achieve their local sustainability goals while also making contributions to achieving statewide and global goals.

Brownfield Redevelopment Solutions, Inc. (BRS) is a women-owned, S Corp, governmental consulting firm providing environmental and resilience planning services to public sector clients. BRS consists of an interdisciplinary team of mission driven professionals who strive to improvecommunities through planning, outreach, and redevelopment projects including resilience projects, brownfields redevelopment, energy sustainability, and park projects.

The Land Conservancy of New Jersey is a nonprofit land trust dedicated to preserving and protecting the natural lands and water resources of New Jersey. The organization works to inspire and empower individuals and communities to preserve land and protect the environment. Accredited by the National Land Trust Accreditation Commission, The Land Conservancy has been recognized for meeting the highest quality standards for protecting open space, upholding the public trust, and ensuring that our conservation efforts are permanent.

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ENDNOTES

1 Link to the Highlands Regional Master Plan and other Highlands Council documents on the Highlands Council web page

2 Rohrbach, T. & Heasly, A. 2023. Guide to Local Climate Change Adaptation Planning: The Model Climate Change-Related Hazard Vulnerability Assessment for New Jersey Municipalities. New Jersey Future

3 (N.J.S.A. 13:20-1 et. seq.) Link to the Highlands Water Protection and Planning Act documents on the Highlands Council web page.

4 Link to the Highlands Regional Master Plan and other Highlands Council documents on the Highlands Council web page.

5 Shope, J., et al. 2023. State of the Climate: New Jersey 2022. Rutgers, The State University of New Jersey, New Brunswick, NJ.

6 DeGaetano, A. 2021. Projected Changes in Extreme Rainfall in New Jersey based on an Ensemble of Downscaled Climate Model Projections. Prepared for: New Jersey Department of Environmental Protection. Department of Earth and Atmospheric Science, Cornell University.

7 Based on how much additional rainfall may occur during a 24-hour period of a 100-year storm under a moderate warming scenario.

8 Environmental Protection Agency. 2021. Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. EPA 430-R-21-003.

9 Flanagan B.E., et al. 2018. Measuring Community Vulnerability to Natural and Anthropogenic Hazards: The Centers for Disease Control and Prevention's Social Vulnerability Index. J Environ Health. Jun;80(10):34-36. PMID: 32327766; PMCID: PMC7179070.

10 FEMA. 2020. Guide to Expanding Mitigation: Making the Connection to Equity.

11 Environmental Protection Agency. 2021. Climate Change and Social Vulnerability in the United States: A Focus on Six Impacts. EPA 430-R-21-003.

12 See the Appendix of this guide: Inclusive Community Engagement for Local Climate and Sustainability Planning.

13 NJSA 40:55D-28

14 American Planning Association, New Jersey Chapter. 2018. Complete Guide to Planning in New Jersey. Fourth Edition

15 Including the seven provisions described in the "Assessing Vulnerability to Climate Hazards" section of this guidance.

16 Adapted from the FEMA, Environmental Protection Service, and Metropolitan Transportation Commission/Association of Bay Area Governments resource, Regional Resilience Toolkit: 5 Steps to Build Large-Scale Resilience to Natural Disasters.

17 For more information about specific climate hazards and the methodology for analyzing exposure and sensitivity to those hazards, see the Model CCRHVA for NJ Municipalities guidance document (citation in Note 2).

18 New Jersey Highlands Water Protection and Planning Council. 2008. Water Resources Volume II: Water Use and Availability. Technical Report.

19 With the resources provided in the Pro Tip, municipalities can quickly decide what to do and how to do it, then pivot from planning to implementation. Sustainable Jersey offers many resources helpful for effective Community Energy Planning including how to use the Template to seek funding from the New Jersey Board of Public Utilities' Community Energy Plan Grant Program. Additionally, the Sustainable Jersey certification program includes an array of sustainable energy "actions" and guidebooks for municipalities and schools. The Sustainable Jersey Data Center provides insights into the current energy system at the local level, as well as historic data that can reveal trends. Municipalities have resources readily available to help them efficiently plan and implement sustainable energy initiatives that contribute to reducing greenhouse gas emissions and directly combat climate change.

20 Colliers Engineering & Design. Technical Report: Economic Growth Inventory, Economic Sustainability Plan for the Highlands Region. Prepared for New Jersey Highlands Council. October, 2021.

21 Colliers Engineering & Design. Technical Report: Economic Growth Inventory, Economic Sustainability Plan for the Highlands Region. Prepared for New Jersey Highlands Council. October, 2021.

22 Colliers Engineering & Design. Technical Report: Economic Growth Inventory, Economic Sustainability Plan for the Highlands Region. Prepared for New Jersey Highlands Council. October, 2021.

23 NJ Highlands Council, et al. 2022. New Jersey Highlands Economic Sustainability Plan.

24 UNDP, UNCDF, & UNEP. 2010. Local Governance and Climate Change: A Discussion Note. This discussion note "tries to articulate in practical terms what has (or has not) been done by local governments (LGs) in addressing climate change, and what can be done to improve outcomes…" It is focused on the developing countries of the Asia-Pacific region, although refers to typical local government structures around the world.This discussion note "tries to articulate in practical terms what has (or has not) been done by local governments (LGs) in addressing climate change, and what can be done to improve outcomes…" It is focused on the developing countries of the Asia-Pacific region, although refers to typical local government structures around the world.

25 DeAngelis, J., Briel, H., and Lauer, M. 2019. Planning for Infrastructure Resilience. American Planning Association PAS Report 596

26 NJSA 40:55D-29

27 In its resource for community officials, Integrating Hazard Mitigation Into Local Planning, FEMA describes four key benefits to integrating hazard mitigation into CIPs: 1) Leverages funding to implement hazard mitigation measures. 2) Helps ensure that public expenditures for capital improvements are consistent with hazard mitigation goals, objectives, and policies. 3) Provides the opportunity to review and consider the impact of proposed improvements on hazard vulnerability, either directly or indirectly, through supporting private investment in land development. 4) Can help guide new growth to safer areas. For more information about local mitigation planning, also see FEMA's Plan Integration: Linking Local Planning Efforts and May 2023 Local Mitigation Planning Handbook.

28 For more information about integrating hazard mitigation into the community's CIP, see the American Planning Association's report Hazard Mitigation: Integrating Best Practices into Planning.

29 For an example, see the Brighton City Capital Project Report Card.

30 See the NJDEP definition of Overburdened Communities.

31 See the NJDEP definition of Environmental Justice Communities.

32 Colliers Engineering & Design. Technical Report: Economic Growth Inventory, Economic Sustainability Plan for the Highlands Region. Prepared for New Jersey Highlands Council. October, 2021.

33 See Article 5.3.3 Development Subject to Water Availability of the Model Highlands Land Use Ordinance.

34 The Sustainable Jersey action linked here includes checklists to use in the review of development applications and projects for promoting implementation of green infrastructure in roadways.

35 Also see the Environmental Protection Agency's 2021 Green Streets Handbook.

36 See Low Impact Development as per Article 7.2 of the Model Highlands Land Use Ordinance.

37 See the NJDEP Substantial Damage Management Plan Template. The FEMA National Flood Insurance Program (NFIP) substantial damage and substantial improvement rules establish that a structure that sustains damages exceeding 50 percent of its market value to repair must be rehabilitated to meet current code. However, to increase the resilience of a community's building stock, municipalities can lower the substantial damage or substantial improvement threshold to less than 50 percent, thereby triggering structures into compliance with current standards and regulations sooner than under the NFIP threshold. Also see FEMA's Substantial Damage Determinations.

38 See Development Served by Septic Systems as per Article 5.3.4 of the Model Highlands Land Use Ordinance.

39 Building codes in NJ are subject to the Universal Construction Code (UCC), Chapter 23 of Title 5 of the NJ Administrative Code, administered by the NJ Department of Community Affairs. FEMA and its NFIP program follow the International Building Code (IBC). Ordinances may reflect federal flood resistant design and engineering standards in the ASCE 24, which is maintained by the American Society of Civil Engineers (ASCE). The requirements of ASCE 24 meet or exceed the NFIP requirements for buildings and structures in special flood hazard areas. See the FEMA explanation at https://www.fema.gov/node/american-society-civil-engineers-flood-resistant-design-and-construction. ASCE 7: Minimum Design Loads for Buildings and Other Structures provides structural design standards, including for fire, flood, snow, rain, and wind loads, and how to evaluate load combinations. ASCE standards are adopted by reference into the IBC. Design standards of the ASCE have been updated to increase the Flood Hazard Area from the 100-year to the 500-year floodplain for structures in Risk Categories II, III, and IV. Under the new guidelines, nearly all structures must now use the 500-year floodplain to determine flood loads. Buildings in Risk Category I may still adhere to the 100-year floodplain design standard. See Supplement 2 for Minimum Design Loads and Associated Criteria for Buildings and Other Structures, ASCE/SEI 7-22, 2021. Regarding wind resistance, FEMA has compiled excerpts of the wind provisions from the 2021 edition of the IBC in The 2021 International Building Code® : A Compilation of Wind Resistant Provisions. See also Improving Windstorm and Tornado Resilience: Recommendations for One-and Two-Family Residential Structures. FEMA & NIST. Feb. 2023; and the Wind Retrofit Guide for Residential BuildingsIn Hurricane-Prone Regions. FEMA P-804. Second Edition. April 2023. The Building Science Resource Library contains all of FEMA's hazard-specific guidance that focuses on creating hazard-resistant communities. Regarding wind resis-

tance, FEMA has compiled excerpts of the wind provisions from the 2021 edition of the IBC in The 2021 International Building Code® : A Compilation of Wind Resistant Provisions. See also Improving Windstorm and Tornado Resilience: Recommendations for One-and Two-Family Residential Structures. FEMA & NIST. Feb. 2023; and the Wind Retrofit Guide for Residential BuildingsIn Hurricane-Prone Regions. FEMA P-804. Second Edition. April 2023. The Building Science Resource Library contains all of FEMA's hazard-specific guidance that focuses on creating hazard-resistant communities. (Information extracted from the Model CCRHVA)

40 Heating, ventilation, and air conditioning.

41 See the Rutgers University Green Infrastructure Guidance Manual for information about bioretention & rain gardens, bioswales, downspout planters, stormwater planters, cisterns & rain barrels, permeable pavements, and tree filter boxes. Also see the New Jersey Developer's Guide to Green Infrastructure and New Jersey Green Infrastructure Municipal Toolkit.

42 A community benefits agreement is a contract between a developer and a community-based organization that exchanges community support for a project in return for improvements and investments that benefit the community from the developer. See the Local Initiative Support Corporation's Community Benefits Agreement Toolkit.

43 For municipalities interested in working with community members to undertake activities to reduce the risk of wildfire impacts to their homes and structures, see the guidance found in the Sustainable Jersey Firewise Community Action.

44 See the Sustainable Jersey Community Wildfire Protection Plans Action. Community Wildfire Protection Plans (CWPPs) are a mechanism for municipalities to address their wildfire risk in a comprehensive manner. These plans promote collaboration and local action. Pursued as a whole, a CWPP and the Ready-Set-Go and Firewise programs can strengthen the success and outcomes of each. CWPPs are developed collaboratively with the municipal government, local fire departments and the NJ State Forestry Services Forest Fire Service and the US Forest Service or other federal agencies, depending on the location of the community.

45 See the Environmental Assessment Ordinance (EAO) Action, which recommends that municipalities take the information gathered from environmental resource inventory and develop ordinances or require mitigation to avoid/minimizing the impact of development on natural resources. An EAO, sometimes called an 'Environmental Impact Statement (EIS) Ordinance, is a tool that helps planning and zoning boards predict potential impacts of proposed development on wildlife and habitat, vegetation, soil, water, and other resources. Additionally, see the Sustainable Jersey Habitat Conservation Ordinance Action for another example on adopting ordinances to protect a range of natural resources in a community.

46 See the Sustainable Jersey Clustering Ordinance Action for guidance on protecting natural resources by focusing land development away from sensitive features.

47 See Article 6.1.3 of the Model Highlands Land Use Ordinance.

48 See Articles 6.1.4 and 6.1.5 of the Model Highlands Land Use Ordinance.

49 See Article 6.2.4 of the Model Highlands Land Use Ordinance.

50 See the Sustainable Jersey Tree Protection Ordinance Action.

51 See the Sustainable Jersey Community Forestry Management Plan and NJUCF Accreditation Action, which provides information on how develop a Community Forestry Management Plan as well as how to pursue grants from NJDEP to help to fund its preparation. Also see the Center for Watershed Protection website for information about urban tree canopies and land use strategies, and examples of urban tree cover plans and actions.

52 See the Sustainable Jersey Open Space Plans Action for developing a plan in accordance with the NJDEP Green Acres program format requirements for enhanced open space funding opportunities. The plan establishes open space goals and policies based on an inventory of existing and potential open space, an assessment of recreation needs, as well as conservation objectives and public access opportunities. The plan provides a framework and direction for achieving these goals by identify areas for preservation, improvement and maintenance.

53 See the Sustainable Jersey Environmental Commission Site Plan Review Action. New Jersey's MLUL stipulates that if an Environmental Commission has prepared and submitted an index of natural resources in the municipality, known as an Environmental Resource Inventory (ERI) or Natural Resources Inventory (NRI), to the Planning Board and Zoning Board of Adjustment, these Boards "shall make available to the Environmental Commission an informational copy of every application for development." (N.J.S.A. 40:55D-27b).

54 Once municipalities have a Community Forestry Management Plan, they have access to implementation funds through the NJ Urban Forest Stewardship Grants program. For guidance on implementing a plan, see Sustainable Jersey Actions: Tree Hazard Inventory Action, Tree Maintenance Program Action, Tree Planting Program.

55 See the Sustainable Jersey Create a Green Development Checklist Action.

56 See Article 6.5 of the Model Highlands Land Use Ordinance.

57 See Article 6.3.3 of the Model Highlands Land Use Ordinance.

58 See Article 5.2.3 of the Model Highlands Land Use Ordinance.

59 See Article 6.9 of the Model Highlands Land Use Ordinance.

60 See Article 6.8 of the Model Highlands Land Use Ordinance.

61 Water Conservation and Deficit Reduction and Elimination Strategies identified in the model plan include: water bill structure/comparison, irrigation system design, leak detection and repair, rate structure, golf course water use, and stormwater ordinance.

62 See Development Subject to Water Availability as per Article 5.3.3 of the Model Highlands Land Use Ordinance.

63 See Highlands Open Water Protection Buffer around all Highlands Open Waters as per Articles 6.2.2 and 6.2.3 of the Model Highlands Land Use Ordinance.

64 See Article 6.6.3 of the Model Highlands Land Use Ordinance.

65 See Articles 6.7.3, 6.7.6, and 6.7.7 of the Model Highlands Land Use Ordinance.

66 See the Sustainable Jersey Water Conservation Ordinance Action for guidance on promoting year-round water conservation, not just during times of late summer drought.

67 See stormwater management resources provided by the Highlands Council.

68 See lake and stream management resources provided by the Highlands Council.

69 See water use and conservation management resources provided by the Highlands Council.

70 See examples of watershed implementation plans provided by the Highlands Council.

71 See the Sustainable Jersey Green Infrastructure Planning Action for guidance on completing an assessment of impervious cover, identification of locations for installation of green infrastructure (GI) to remove the amount of impervious cover, and establishment of goals for impervious cover replacement and installation of GI projects. For guidance on implementing GI projects, see the Sustainable Jersey Green Infrastructure Implementation Action. GI methods are management practices that address stormwater runoff through soils or reuse, and these resources help identify the ongoing management practices needed to keep the GI functioning.

72 See the Sustainable Jersey Anti-Idling Education & Enforcement Program Action. New Jersey has had a no-idling regulation for diesel-fueled commercial vehicles since 1972. This law was updated in 2009 to include a provision that states that, with limited exceptions, no motor vehicle (diesel or gasoline fueled) may have its engine running if motionless for more than three consecutive minutes. Despite these provisions, idling continues to occur in communities throughout New Jersey. This action provides guidance on how a municipality can tackle this important issue.

73 Information Source: US Environmental Protection Agency Burn Wise.

74 For more information about supporting what the Urban Institute refers to as, the "social sector infrastructure—an ecosystem of providers that offer services focused on sustainability, learning, relationships, and influence to social sector organizations, groups, and individuals," see their resources at: Exploring the Social Sector Infrastructure.

75 See the Sustainable Jersey Extreme Temperature Event Plan Action.

76 See the Sustainable Jersey Vulnerable Populations Identification for Emergencies Action and the Community Equity and Diversity Profile Action.

77 See the New Jersey Model Code Coordinated Ordinances.

78 To implement the regulation, see the Sustainable Jersey Heat Island Assessment & Mitigation Plan action.

79 A green roof is a vegetative layer grown on a rooftop. Green roofs provide shade, reduce roof surface temperature by as much as 30 to 40° Fahrenheit, and reduce building energy use. Cool (white) roofs, are made of highly reflective materials that remain cooler than traditional materials during peak temperatures and can lower extreme temperature by as much as 4° Fahrenheit. Green roofs often have initially higher installation costs than cool roofs, but both roof types provide benefits of lower surface

and air temperatures and decreased energy demand. However, green roofs offer added benefits such as reducing and filtering stormwater runoff, absorbing pollutants and carbon dioxide, providing natural habitat, and in the case of intensive green roofs, serving as recreational green space. Sources: https://www.energy.gov/energysaver/cool-roofs, https://www.epa.gov/heatislands/using-green-roofs-reduce-heat-islands#5

80 See the Sustainable Jersey Ready Set GO! Fire Company Action for guidance on how to prepare for and ensure timely communications between the local fire company and homeowners and businesses in the event of a wildfire.

81 See the best management practices and preparedness planning guidance provided by the NJ Forest Fire Service and the NJ Fire Danger Dashboard.

82 See the Sustainable Jersey Bicycle and or Pedestrian Plan Action.

83 See the Sustainable Jersey Farmland Preservation Plan Action for guidance on active municipal participation in farmland preservation initiatives.

84 See Schilling, Brian, J. et. al. The Opportunity for Agritourism Development in New Jersey. Chapter: Municipal Support of Agritourism. A Report Prepared for the New Jersey Department of Agriculture.

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90 Masson-Delmotte, V. et al. 2021. Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).

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92 Purvis, B., Mao, Y. & Robinson, D. 2019. Three pillars of sustainability: in search of conceptual origins. Sustainability Science 14, 681–695. https://doi.org/10.1007/s11625-018-0627-5.

93 NJ Highlands Council, et al. 2022. New Jersey Highlands Economic Sustainability Plan.

94 Principle 1 of the Rio Declaration states that "Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature" (UN, 1992). United Nations Conference on Environment and Development (aka 1992 Rio Earth Summit).

95 Roundtable on Environmental Health Sciences, Research, and Medicine; Board on Population Health and Public Health Practice; Institute of Medicine. Public Health Linkages with Sustainability: Workshop Summary. Washington (DC): National Academies Press (US); 2013 Jul 19. 2, Overview of The Links Between Sustainability and Human Health. Available from: https://www.ncbi.nlm.nih.gov/books/NBK202304/

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102 liskey, A., Alessa, L., Griffith, D. et al. 2021. Transforming sustainability science for practice: a social–ecological systems framework for training sustainability professionals. Sustain Sci 16, 283–294. https://doi.org/10.1007/s11625-020-00846-2.

103 See the Appendix of this guide: Inclusive Community Engagement for Local Climate and Sustainability Planning.

104 N.J.A.C. 13:20-1 et seq.

105 Link to the Highlands Regional Master Plan and other Highlands Council documents on the Highlands Council web page.

106 N.J.S.A. 13:20-8

107 N.J.A.C. 7:38

108 A1559

109 A3062, S1303

110 A4540

111 S606

112 A-2785/S-2607 (§2 C.40:55D-28.1)

113 See the NJ Office of Planning Advocacy's Municipal Climate Resilience Planning Guide.

114 N.J.S.A. 13:1d-157

115 N.J.A.C. 7:1C

116 Municipal Plan Endorsement Guidelines, Adopted October 17, 2007, Revised February 2010, October 2020

117 § 52:18A-202a

118 2019 New Jersey Energy Master Plan: Pathway to 2050

119 New Jersey's Global Warming Response Act 80x50 Report

120 S3223

121 NJ Department of Community Affairs (DCA) Model Statewide Municipal EV Ordinance

122 New Jersey's Community Energy Plan Grant Program

123 State of New Jersey Climate Change Resilience Strategy developed the NJ Department of Environmental Protection.

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131 FEMA 2022 Local Mitigation Planning Policy Guide

132 Stafford Act

133 CFR Section 201-Mitigation Planning

SUSTAINABILITY AND CLIMATE ADAPTATION PLANNING:
AN INTEGRATED GUIDE FOR HIGHLANDS REGION MUNICIPALITIES

2024

Highlands Council
New Jersey

NEW JERSEY FUTURE

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