

The City of White Plains

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Climate Vulnerability Assessment and Adaptation Plan



September 2024

Produced by the City of White Plains CAPI Adapt Team
with Assistance from the Hudson Valley Regional Council and
ICLEI – Local Governments for Sustainability USA

Adopted on [Date]

Credits and Acknowledgments

This assessment was prepared by the CAPI Adapt team from the City of White Plains comprised of the following individuals:

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Executive Summary

Climate change leads to a wide range of hazards, with rising concerns due to the increasing rate of climate events. Based on scientific data collected over decades, the largest threats to the City of White Plains stem from hazards associated with increasing temperatures, rising sea levels, and changing precipitation patterns.

These hazards cause social, environmental, and infrastructure damage and losses outlined in this climate vulnerability assessment (CVA). To avoid such damage today and into the future, the City of White Plains administration must work with partners, such as community-based organizations, regional planning organizations, states, and federal agencies, to increase the City's resiliency and adapt to new, more hazardous conditions. Devastating storms, such as Tropical Storm Isaias and Irene and Superstorm Sandy, have reinforced this need and led communities in Westchester, such as White Plains, to a greater focus on climate resiliency planning to protect residents and mitigate risk. Ultimately, White Plains' leadership on climate resilience will reduce the exposure and vulnerability of residents, infrastructure, and ecosystems, and will serve as a model for communities across New York State and the country.

The Climate Smart Communities (CSC) Program provides a framework for implementing climate-smart resiliency actions. This CVAAP is one of the fundamental actions in the Pledge Element (PE) 7 category. The CSC Program ensures that recommendations to promote community resiliency are based on climate science and relevant data and address the top hazards in a community. The framework mandates an inclusive process, with public outreach and engagement each step of the way. Members of the White Plains CAPI Adapt Team met with municipal officials and committees, tabled at local events, leveraged the municipal web site and social media platforms to solicit feedback, and participated with CAPI Adapt cohort.

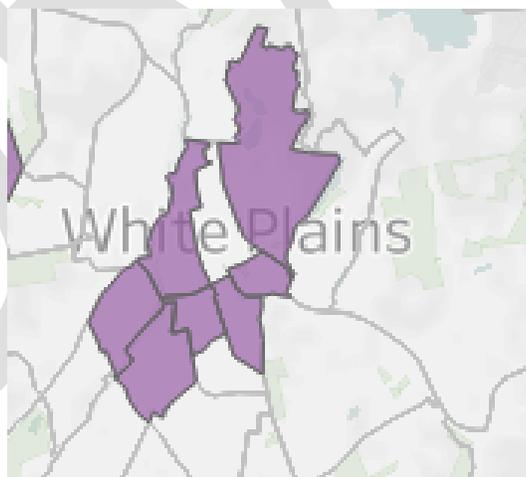
Among the City of White Plains key findings included the impact of rising temperatures and heat waves on vulnerable populations, such as the elderly, and the effects of sea level rise and flooding on local roads highways, dams, and low-lying buildings, train tracks, and electrical conductors. The assessment also considers the multitude of secondary effects from changing precipitation patterns, i.e., heavier downpours on trees and wires creating power outages, as well as on storm drains and undersized culverts or passages that become easily clogged and overwhelmed.

Introduction

The City of White Plains New York is located in mid-Westchester County, New York, surrounded by the Town of North Castle, the Town/Village of Harrison, the Village of Scarsdale, and the Town of Greenburgh. As of 2020, the population of White Plains was 59,559 people with 20.1% of the total population being 65 years or older. White Plains has an estimated area of 9.9 square miles.

According to 2020 US Census data, the City of White Plains has a poverty level of 10%, similar to that of Westchester County at 9.3%. The 2022 American Community Survey 5-Year estimates found that residents under 18 experience a 13.1% poverty rate. Additionally, it found that 9.6% of residents from 18 to 64 years' experience poverty, and 8.7% of residents 65 years and over experience poverty. The 2020 median household income (MHI) in White Plains was \$109,551¹. This is slightly above the MHI for all of Westchester County, which was \$108,144. Married-couple families were found to have the highest median income at \$168,354. "Non-family" households were found to have the lowest median income at \$62,685.

The New York State Climate Act has worked with the Climate Justice Working Group to identify communities within New York State that need aid to help with a transition to cleaner, greener energy, reduced pollution, and economic opportunities². Included below is a map of all disadvantaged communities found within the White Plains New York. The City of White Plains was found to have 7 disadvantaged neighborhoods that may experience increased Environmental Burden & Climate Change Risk because of factors like Remediation Sites, Housing Vacancy Rate, Chemical Sites, Industrial Manufacturing Land Use Zones, etc. Included below is a map of all Disadvantaged Communities found within the City of White Plains.



¹ *White Plains New York - Census Bureau Search.* <https://data.census.gov/all?q=White%20Plains%20New%20York>. Accessed 17 July 2024.

² *Disadvantaged Communities Criteria - New York's Climate Leadership & Community Protection Act.* NYSERDA, <https://climate.ny.gov/Resources/Disadvantaged-Communities-Criteria>. Accessed 17 July 2024.

Background of City of White Plains' climate planning accomplishments

In 2021, In 2024, the City of White Plains Common Council adopted the One White Plains Comprehensive Plan that includes six elements – one of which is greenWP focused on climate actions. Also in 2024, the City performed an Government Operations Greenhouse Gas Emissions inventory. The inventory was then followed up by the creation and adoption of a Government Operations Climate Action Plan. The City participated in a Climate Action Planning Institute cohort convened by HVRC and ICLEI, who provided significant assistance to the government operations inventory and plan. In acknowledgement of the substantial work undertaken by the City, the City of White Plains was certified as a Bronze level Climate Smart Community in 2023 and then achieved Silver Certification in 2024.

The City's planning, legal, and regulatory documents, including building codes, land use codes, subdivision ordinance, site plan ordinance, stormwater management ordinance, environmental protection ordinance, each have important contributions to the City's efforts to mitigate and adapt to current and future climate challenges.

What is a CVA and why complete one?

A climate vulnerability assessment identifies community assets, systems, and populations that are susceptible to climate change. A vulnerability assessment is a necessary step in developing a climate adaptation strategy because it identifies and characterizes the environmental, infrastructural, and social elements of a community that need adaptive measures. Completing a vulnerability assessment includes the following steps:

- Identify climatic hazards occurring and likely to occur within the geographic boundary of interest.
- Identify community assets, systems, and populations currently and likely to be exposed to the identified climatic hazards.
- Assess the sensitivity and adaptive capacity of each exposed asset, system, and population to each applicable hazard.
- Use a scoring or prioritization methodology to rank each identified community facet to inform an adaptation strategy.

A CVA increases local awareness and literacy of climate vulnerability and resilience and encourages a community to take ownership and support implementation of actions.

Vulnerability Assessment Background and Considerations

Methodology

Anticipated shifts in climate and environmental conditions, such as changes in storm intensity, heat waves, and sea level rise, are expected to impact interactions with natural resources as well as infrastructure and social assets. Many resources are available to aid in understanding and assessing the potential impacts of different climate change scenarios on communities in our region. This assessment process incorporated a variety of tools and data sources, selected based on their practicality, comprehensiveness, and potential for future updates. Those include:

- [New York State's 2024 Climate Impacts Assessment](#)
- [NYSERDA's ClimAID Report](#)
- [NOAA National Centers for Environmental Information, 2023 Global Climate Report](#)
- [Scenic Hudson's Sea Level Rise Mapper](#)
- [The US Fifth National Climate Assessment](#)

These tools, along with others used in this report, highlight numerous potential future scenarios. A complete list of tools used is included in the reference section. Given the complexity of both global and local factors influencing these outcomes, predicting specific scenarios is challenging. Therefore, it is crucial to prepare for a range of possibilities. Despite this uncertainty, general trends and approximate estimates can guide adaptation planning efforts.

The methodology's context and components are elaborated upon in subsequent sections. The approach taken in this vulnerability assessment aligns with the criteria of the New York State Climate Smart Communities program and ICLEI's GreenClimateCities framework.

Process

The development of this plan has been embedded in the One White Plains Comprehensive Planning process. The comprehensive plan is structured around six elements, including greenWP that seeks to respond to climate change and promote sustainability through the lens of both mitigation and adaptation. Creation of greenWP was an iterative process that brought together community members, municipal leaders and subject matter experts to explore and consider relevant data and craft a coherent response that benefits all members of the White Plains Community. The City of White Plains CAPI Adapt team built on this participant engagement work with specific focus on identifying climate-vulnerable assets for the purpose of incorporating the greenWP initiatives into this plan.

- **Phase 1 Visioning:** A visioning process with extensive community input was conducted through an in person "Listening Tour" that included stops at food distributions, the Farmers Market, Senior picnics, and parks. Additional input came in on-line as part of a survey and social pinpoint strategy. Materials were available in English and Spanish. The overall vision included a clear mandate for mitigation and adaptation strategies.
- **Phase 2 Expert Review:** Subject matter experts performed a thorough analysis of current conditions and state of the art solutions. The firm that spearheaded this is Ramboll, a global architecture, engineering, and consultancy company, delivering expertise and sustainable

solutions. Ramboll drafted a menu of initiatives aimed at mitigating the City's role in contributing to climate change while at the same time adapting to those changes so that the entire White Plains community remains resilient now and in the future.

- Phase 3 Public Input: The draft initiatives were brought back out to the community for additional public input. Targeted meetings were held with municipal leaders including Public Safety, Public Works, the Building Department and Recreation and Parks. Community workshops were hosted in both English and Spanish giving participants a chance to speak with subject matter experts and each other to further define the initiatives.
- Phase 4 CAPI: Contemporaneously with the Comprehensive Plan process, the City of White Plains began participating in the CAPI cohort and receiving further expert guidance from ICLEI and HVRC. The CAPI process led the City of White Plains through a government operations greenhouse gas emissions inventory and then the development and adoption of the Government Operations Climate Action Plan which included several adaptation targets. Representatives of the City of White Plains participated in a CAPI Adapt Program workshop on February 8th, 2024. In that workshop, the Team engaged in three exercises on equity brainstorming, assessing community assets and vulnerabilities, and adaptation ranking strategies. The Team was asked to identify infrastructural, environmental, and social assets in the community, determine which assets are most susceptible to the identified climate hazards, and to prioritize potential actions to safeguard these assets. The CAPI Adapt workshop yielded a number of assets, which were then organized into distinct categories or areas of concern and prioritized. The output of this work was shared with the City of White Plains staff and Climate Smart Communities Task Force.
- Phase 5 CVAP Targeted Input (In process): The Team will review the adaptation strategies and priorities from previous plan, most importantly, the City's detailed Hazard Mitigation plan, and engage with key stakeholders and the public to gather feedback.
- Phase 6 City Council (Planned): The CAPI Adapt team members will present a draft CVA and adaptation plan to the City of White Plains for review on November XX. During each phase, project updates are made available on the City's web site.

Summary of Findings: Hazards

The Hudson River Estuary Program prepared the summary of local climate hazards in this chapter as a part of the Climate Action Planning Institute (CAPI). The chapter identifies historic climate trends and introduces future projections to address the climate hazards most likely to affect Westchester County in the coming decades.

The data serves as a starting point for recognizing important climate hazards and risks in Westchester County but is limited to information available to the New York State Department of Environment Conservation (NYS DEC) and its partners at the time of this writing and is not a substitute for on-site survey and assessment. New York's changing climate presents new challenges and opportunities for communities in the State. It is vital for local decision-makers and community members to understand their community's vulnerability to a changing climate and take steps to increase their climate resilience.

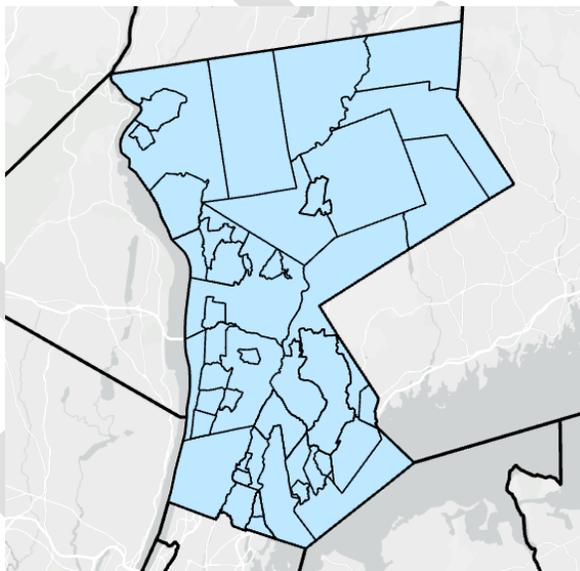


Figure 1: Map of Westchester County

Using the Governors' 2100 Commission report and the NYS Climate Impacts assessments, this document presents the Westchester County primary climate hazards and the risks and opportunities they present. A lot can change in a century, so it is never too early to start.

Three significant climate hazards (trends) are expected to affect New York State residents during the 21st century: increasing temperatures, rising sea level, and changing precipitation patterns. These trends are leading to three primary climate risks (human impacts): heat waves, flooding, and drought. Communities can plan and implement resilience strategies to reduce their vulnerability and thrive under changing conditions.



Increasing Temperatures

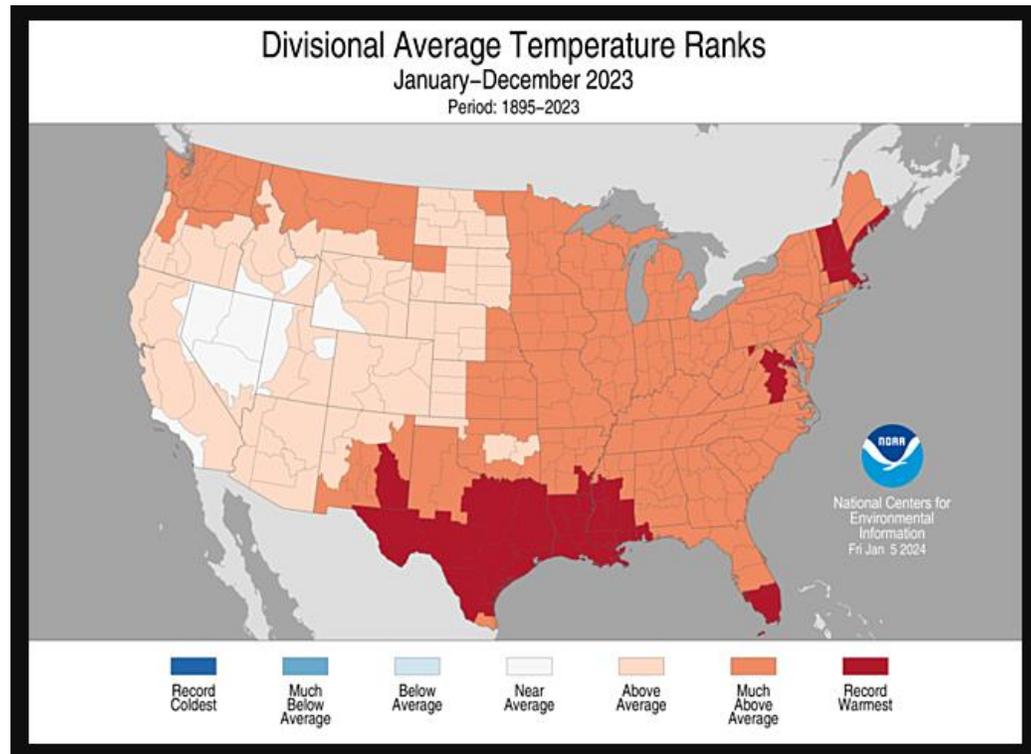


Figure 2: Divisional Average Temperature Ranks. Source: National Centers for Environmental Information

Annual average temperatures have been steadily increasing in New York State, posing new challenges to human health, electricity demand, and many of our industries, including tourism, recreation, and agriculture. Since 1970, temperature increases in New York have surpassed national and global averages:

- 2023 Global annual average temperature up **2.12°F** above 20th century average.¹
- 2023 U.S. annual average temperature up **2.4°F** above 20th century average.²
- 2023 NY annual average temperature up **2.2°F** above the average from 1991 - 2020.²

The average annual temperature around Westchester County is expected to increase approximately four to six degrees by mid-century and as much as 11 degrees by 2100.² As a reference point, by the 2080s, New York City's average temperature is projected to be on par with the 20th century average for Birmingham, Alabama.³

	Baseline 1981 - 2010	2030s	2050s	2080s	2100
Annual average air temperature	50.8° F	52.8 – 55.7°F	54 – 58°F	55.6 – 62.7°F	56° – 64.7°F
Increase in annual average		2.0 – 4.9°F	3.2 – 7.2°F	4.8 – 11.9	5.2 – 13.9°F

Table 1. Like all projections, these climate projections have uncertainty embedded within them. Sources of uncertainty include data and modeling constraints, the random nature of some parts of the climate system, and limited understanding of some physical processes. Levels of uncertainty are characterized using state-of-the-art climate models, multiple scenarios of future greenhouse gas concentrations, and recent peer-reviewed literature. Even so, the projections are not true probabilities, so the specific numbers should not be emphasized, and the potential for error should be acknowledged. Source: Climate Impacts Assessment.³

An analysis of historical trends in annual average temperature and precipitation was conducted for 27 weather stations across New York State. Below are the results from the Southern Hudson River Valley’s Dobbs Ferry weather station in New York State taken from the latest New York State Climate Change Projections.³

Trend in Annual Average Temperature from 1901-2020 from observed weather stations
❖ Temperature increases for Southern Hudson River Valley - Dobbs Ferry: 0.34 °F/decade
Trend in Average Annual Precipitation from 1901–2020 for Observed Weather Stations in New York State
❖ Precipitation increases for Southern Hudson River Valley – Dobbs Ferry: 0.39 inches/decade

Table 2. Trend is significant at the 99% significance level. Source: Weather Station Data: Dobbs Ferry, NY

Projected Temperature Changes for Dobbs Ferry, New York

	Baseline 1981- 2010	2030s	2050s	2080s
# Days per year above 90°F	18	29 – 57	34 – 73	48 – 108
# Days per year above 95°F	4	7 – 29	9 – 38	18 – 76
# Heat waves per year	2	4 – 8	5 – 9	6 – 10
Average # days of each heat wave	4	5 – 6	5 – 6	5 – 10
Maximum heat Index	100	106 - 114	108 - 120	112 - 136
# Days per year ≤ 32°F	106	67 – 90	37 – 82	8 – 74

Table 3. Projections are based on 16 GCMs (14 for heat index) and 2 SSPs and are relative to the 1981– 2010 base period. Baseline data are for the 1981–2010 base period and are from the NOAA National Centers for Environmental Information (NCEI). Decimal places are shown for values less than 1, although this does not indicate higher precision or certainty. Heat index was computed using the formula from the National Weather Service. Source: Stevens, A., & Lamie, C., Eds. (2024). New York State Climate Impacts Assessment: Understanding and preparing for our changing climate. <https://nysclimateimpacts.org>



Rising Sea Level

Global sea level is rising due to various factors, including thermal expansion from warmer water temperatures, and melting of land-based ice. The Hudson River is connected to and influenced by the sea; therefore, it experiences tides and contains saltwater in its lower reaches. This is why the river south of the federal dam at Troy is considered an estuary. It is also the reason why the Hudson River’s water level is rising with global sea level.

Since 1900, sea level in the lower Hudson has risen over 13 inches.⁴ Below are Albany sea level rise projections taken from the 2023 Climate Impacts Assessment for New York State which are based on the results from the [IPCC 6th Assessment report](#) and show the range from the low-estimate (10th percentiles) to the high-estimate (90th percentile). The table showing the projections of the sea-level rise with rapid ice melt were taken from NYS 2100 Commission Report. The rapid-ice melt scenario is based on acceleration of recent rates of ice melt in the Greenland and West Antarctic Ice sheets and paleoclimate studies. These projections are consistent with the most recent projections released by New York State in the Governor's 2100 Commission report (<http://goo.gl/K9ohoi>).⁵

	2030s	2050s	2080s	2100
New York City (The Battery) Sea Level Rise - Inches	6" – 13"	12" – 23"	21" – 45"	25" – 65"

Table 4. Like all projections, these climate projections have uncertainty embedded within them. Sources of uncertainty include data and modeling constraints, the random nature of some parts of the climate system, and limited understanding of some physical processes. Levels of uncertainty are characterized using state-of-the-art climate models, multiple scenarios of future greenhouse gas concentrations, and recent peer-reviewed literature. Even so, the projections are not true probabilities, so the specific numbers should not be emphasized, and the potential for error should be acknowledged. Source: [NYS Climate Impacts Assessments](#).³

	2020s	2050s	2080s	2100
Sea- Level Rise with Rapid Ice Melt	4"-9"	17"- 26"	37"- 50"	52" – 68"

Table 5. Values are the central range (middle 67%) of model-based probabilities rounded to the nearest inch. The rapid-ice melt scenario is based on acceleration of recent rates of ice melt in

the Greenland and West Antarctic Ice sheets and paleoclimate studies. These projections are consistent with the most recent projections released by [New York State in the Governor's 2100 Commission report](#). Source: [NYS 2100 Commission Report](#).⁵



Figure 3: Map of Sea level rise projections for Westchester County⁶



Changing precipitation patterns

Precipitation has become more variable and extreme, whereas total rainfall has changed only marginally. **The total annual precipitation in New York State from 1901 – 2022 has increased by 10% to 20%.** Overall, while New York is projected to remain a “water-rich” state, water quality can be affected by the increase in total precipitation.³

The below table depicts the projections for average precipitation (mean precipitation) for the South Hudson River Valley, in which Westchester County is located. These projections were taken from the NYS Climate Impacts Assessment and are based on the global climate model (GCM) simulations from the latest version of the world climate research program’s [Coupled Model Intercomparison Project](#)³

	Baseline 1981-2010	2030s	2050s	2080s	2100
Mean Precipitation	45.8 in.	45.8” – 50.4”	46.3” – 51.8”	46.7” – 55.9”	44.9” – 58.6”
% Increase in precipitation		0 – 10%	1-13%	2 – 22%	2 – 28%

Table 6. Like all projections, these climate projections have uncertainty embedded within them. Sources of uncertainty include data and modeling constraints, the random nature of some parts of the climate system, and limited understanding of some physical processes. Levels of uncertainty are characterized using state-of-the-art climate models, multiple scenarios of future greenhouse gas concentrations, and recent peer-reviewed literature. Even so, the projections

are not true probabilities, so the specific numbers should not be emphasized, and the potential for error should be acknowledged. Source: [NYS Climate Impacts Assessments](#).³

Projected Changes in Extreme Events for Dobbs Ferry, New York

	Baseline 1981-2010	2030s	2050s	2080s
# Days with precipitation > 1"	15	15 – 19	15 – 18	15 – 19
# Days with precipitation > 2"	3	4 – 5	4 – 5	4 – 6
# Days with precipitation > 4"	0.2	0.2	0.2	0.2 – 0.6

Table 7. Projections are based on 16 GCMs (14 for heat index) and 2 SSPs and are relative to the 1981– 2010 base period. Baseline data are for the 1981–2010 base period and are from the NOAA National Centers for Environmental Information (NCEI). Decimal places are shown for values less than 1, although this does not indicate higher precision or certainty. Heat index was computed using the formula from the National Weather Service. Source: Stevens, A., & Lamie, C., Eds. (2024). New York State Climate Impacts Assessment: Understanding and preparing for our changing climate. <https://nysclimateimpacts.org>

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Summary of Findings: Key Assets and Vulnerabilities

Westchester County has had a growing number of natural and non-natural hazard events, several of which have caused municipal-specific loss and damage to the city. The City's Hazard Mitigation Plan, completed in 2021, includes events of concern that occurred between 2017 to 2021. The most serious events occurred in 2020, including two hazardous events stemming from natural causes. One of those two events was a high wind storm with wind speeds reported at 70 mph. The other was the result of a tropical storm that reportedly caused \$801,000 in damage within the city.

White Plains has reviewed Westchester County's recently updated Hazard Mitigation Plan to better prepare for potentially at-risk elements. In prioritizing assets and community systems for this assessment, several factors were considered. These include but are not limited to the below-listed key terms. The definitions for the terms are found in Appendix B.

- the exposure of the community asset or system component to climate change impacts, placing it in context of the climate impact reactions – Could this be significantly impacted now or in the future?
- the sensitivity of the community asset or system component (existing stressors, fragility, etc.) – How and how severely could this be impacted when exposed to a climate hazard?
- the adaptive capacity of the community asset or system component (internal strengths, capacities or mechanisms for defense, protection, avoidance, or accommodation that are activated) – What innate defensive, protective, avoidance or accommodation capabilities can or will be activated and how effective could this be? What redundancies or design features are built into the asset or system that can reduce impacts and/or protect the asset or system from failure?

Infrastructure Assets

As mentioned above, the 2021 Hazard Mitigation Plan for White Plains includes a section discussing infrastructure the city has deemed at risk. Other Infrastructure Assets identified by the City of White Plains can be found in the section titled **Identified Issues** in the City's Hazard Mitigation Plan³. The City has also identified important community assets.

³ <https://planning.westchestergov.com/images/stories/pdfs/HazardMitigation/96wp.pdf>

Table 7: Identified Infrastructure Issues

Name	Description
Aging Community Facilities	This includes facilities in danger of failing during a hazard event, which can limit the use of facilities during a hazard event.
Cooling Centers	These centers currently lack backup power, making them less useful during extreme events.
Fire Stations	One of the critical facilities is that lack back-up power making them less useful during hazardous events.
Cloverdale Avenue	A road section that experiences frequent flooding.
Smith Avenue	A road section that experiences frequent flooding.
Bloomington Road	A road section that experiences frequent flooding.
Brockway Place	A road section that experiences frequent flooding.
Harlem Avenue	A road section that experiences frequent flooding.
Bronx River and Central Westchester Parkway	A road section that experiences frequent flooding.
Kensico Dam and Silver Lake Dam	If these dams were to experience a failure the City of White Plains would be significantly affected.
White Plains Municipal Building	A critical facility that provides emergency services and that lacks permanent backup power.
White Plains High School	A critical facility that provides emergency services that lacks permanent backup power

Environmental Assets

As part of the Comprehensive Plan process, the city has conducted an Environmental Assessment Form to determine the impacts that proposed updates to city infrastructure may have on the local environment. Sustainability initiatives introduced in the Environmental Assessment Form are included in the Comprehensive Plan element: greenWP. "GreenWP is designed to identify and support existing environmental resources and green initiatives, with the goal of developing new policies and programs to mitigate climate change, sustainable development, protect ecological systems and the environment". Some actions included in the greenWP initiative can be found below.

Initiative Topic	Action
Environmentally sensitive sites	Update regulations to protect and restore wetlands, discourage development within regulated floodplains and areas prone to localized flooding.
Impervious surfaces	Zoning updates and regulations to limit coverage, improve stormwater runoff, and increase greenspace.
Biodiversity	Plant native plants and establish pollinator habitats
Open Space	Expand and protect open spaces

The Environmental Assessment found that proposed improvement strategies will not have moderate or large impacts. Additionally, any development activities will be required to address environmental impacts having to do with the following areas: Land Use, Zoning, and Public Policy; Visual and Community Character; Cultural Resources; Geology/ Soils; Vegetation and Wildlife; Community Facilities; Infrastructure /Utilities; Stormwater Management; Energy Usage; Transportation; Air Quality; Noise; Hazardous Materials and; Wind.

The City of White Plains is fortunate enough to have a sizable number of natural areas, including [dozens of parks and greenways](#), which include a variety of tree species. The City only plants native trees; this helps to conserve water, protect the soil from erosion, and create habitats that support biodiversity. Outdoor areas and parks are important to City residents. For a full list of City parks, see the One White Plains Comprehensive Plan.

Social Assets

Community resilience and emergency response and [stormwater management](#) are very important in White Plains. With the increase in severe storms, heat waves and flooding, the City is increasingly aware of establishing processes, systems and educational outreach to assist residents, especially vulnerable populations. Important social assets considered in the White Plains Hazard Mitigation Plan include the City's Emergency Response Plan, Outreach, and Public Education on environmental concerns. The White Plains Hazard Mitigation includes sections that address current and proposed hazard mitigation initiatives.

During several recent large storms, flooding has been reported in numerous parts of the city. According to the Hazard Mitigation Plan, There are 1,558 properties in White Plains at risk of flooding over the next 30 years. This represents 16% of all properties in White Plains⁴. During public outreach efforts, concerns were raised about the availability of water and food during a flood. Power outages from severe storms and extreme heat events is also a large concern. While most residents report accessible healthy and affordable food, vulnerable White Plains residents do experience food insecurity. Low-income individuals and families are at greatest risk as they may lack the resources to prepare/protect themselves and to recover from disasters. The elderly and those reliant on social service agencies or houses of worship to supplement their food intake are particularly threatened by climate change; these groups should be a priority. Senior populations may be isolated and experience communication and mobility challenges. Heat-related illnesses can impact the health of the entire community, with an increased impact on seniors.

⁴ First Street, White Plains Flood Risk, https://firststreet.org/city/white-plains-ny/3681677_fsld/flood

Summary of Findings: Recommendations for Adaptation

Vision Statement

The City of White Plains aims to mitigate and adapt to climate change and its negative impacts while advancing equity and economic development goals.

This vision reflects the aspirations and values of the community. This vision is backed by the four (4) E's of sustainability: economy, equity, environment and energy which create the ability for a community to meet its needs without compromising the ability of future generations to meet their own needs.

The adaptation strategies or recommended actions listed in the following sections are broken out into three categories or sectors: infrastructure, environmental and social. Each strategy is connected to an initiative outlined in the One White Plains Comprehensive Plan. In each sector, a detailed description is included for each strategy, information on co-benefits, owner, strategy cost and timing estimates, and other information relevant to the proposed strategy.

Co-Benefits of Climate Adaptation Strategies

Co-benefits have been assigned to each adaptation strategy to better understand the impact each may have on the community and determine what benchmarks may be used to determine the successes of each strategy. Included in the table below are co-benefits with its visual indicator.

Co-Benefit: High potential to:	Symbol
Save money	
Enhance resource security	
Create jobs	
Improve public health	
Deliver benefits to frontline communities	
Lower greenhouse gas (GHG) emissions	

Table 9: Co-Benefit Symbols

1. Saving Money

Many adaptation measures in this plan pay for themselves by reducing direct or indirect costs, such

as infrastructure damage from more frequent and intense extreme storms.

2. Enhancing Resource Security

A strategic side benefit of climate change adaptation activities may be enhanced energy security through reduction in total demand. Planting more trees, for example, will reduce the heat island effect, decreasing strain on the energy system, and leading to fewer service disruption during times when cooling is most needed.

3. Creating Jobs

Climate adaptation measures can spur business and job growth during the design, manufacture, and installation of energy efficient technologies and other green sectors. This presents a particular opportunity to reinvest in the local economy and generate green jobs within the municipality.

4. Improving Public Health

Climate change adaptation activities may foster healthier communities and advance public health outcomes. Trees for example provide oxygen, shade and absorb air pollutants, and tree planting efforts can improve air quality.

5. Delivering Benefits to Frontline Communities

Social equity is a major concern for addressing climate change. Research shows that vulnerable populations such as the elderly or chronically ill, low-income families, and people of color are more at risk when it comes to experiencing impacts of climate change. These communities already experience institutional and systematic oppression that results in less access to resources, capital, and services. Climate change exacerbates these gaps. By targeting programs and making changes to services or infrastructure, such as modifying flood protection and heat emergency response programs, before extreme events happen, we can mitigate the most devastating impacts to already vulnerable populations.

6. Reducing Greenhouse Gas Emissions

Many of the actions identified here to adapt to climate change will also help mitigate GHG emissions. For example, building microgrids powered by solar or hydropower will not only increase resiliency but will help to lower GHG emissions reductions.

Infrastructure Adaptation Strategies

Infrastructure adaptation strategies involve improving buildings and facilities. The White Plains adaptation strategies referring to building and facilities energy sector focus on **retrofitting existing buildings** to be more adaptive to impacts of climate change (greenWP 25). Impacts of climate change, such as extreme weather events, extreme heat, and flooding, can increase the risk and vulnerability of existing buildings. Retrofitting existing buildings to be more adaptive to climate change can reduce

damages and costs associated with extreme events and reduce health impacts on building occupants. Adaptation measures for climate hazards could include:

Strategy 1: Demand response programs to reduce electricity use during peak periods to prevent power outages; energy storage to provide backup power during power outages to adapt to extreme weather conditions.

Potential Cost: Minimal, could generate income

Timeframe: 2024-2027

Owner: DPW

Co-Benefits:   

Strategy 2: Improved insulation, passive cooling, shading, and cool roofs; ensuring that buildings housing vulnerable populations have **adequate mechanical ventilation and cooling** to adapt to extreme heat conditions.

Potential Cost: Costs to implement this strategy in municipal buildings may be high but will also be associated with a return on investment in utility savings. For private buildings, the cost may translate to higher housing costs.

Timeframe: 2024-2034

Owner: DPW and Planning

Co-Benefits:     =

Strategy 3: Relocating mechanical systems above flood levels, elevate buildings within flood prone areas, and reduce impervious surfaces outside of buildings to adapt to increased flooding risk.

Potential cost: Costs will range from moderate to significant. Cost savings will be realized in terms of fewer losses during extreme weather incidents.

Timeframe: 2025-2035

Owner: DPW

Co-Benefits:   =

Environmental Adaptation Strategies

The City of White Plains has strengthened protection of natural environments by investing in renewable energy strategies, supporting recycling efforts, and changing community transportation habits. Some past actions include improving flood resiliency, implementing a storm water maintenance program, enhancing natural systems, and watershed maintenance and restoration. The table below includes environmental mitigation/ adaptation actions included in the City of White Plains One White Plains Comprehensive Plan and the City's Hazard Mitigation Plan.

Strategy 1: Maintain and upgrade the City’s stormwater management infrastructure to maintain maximum efficiency (strengthenWP6): Continue to undertake regular maintenance of storm drains and replace undersized pipes as needed. Such enhancements, together with stormwater management techniques which reduce the amount of impervious surface in White Plains, will help to reduce flooding and protect rainwater runoff from collecting pollutants that contaminate natural waterways and water supply

Potential Cost: Moderate

Timeframe: Ongoing

Owner: DPW

Co-benefits:   =

Strategy 2: Establish an impervious surface definition in the Zoning Ordinance and develop regulations that limit coverage of a site to improve stormwater runoff and increase green space (greenWP 3). Impervious surfaces are areas where water cannot penetrate the ground surface (i.e. parking lots, buildings, and other paved areas), leading rainwater to flow over these surfaces directly into catch basins, streams, and wetlands. Permeable pavements, however, infiltrate, treat, and/or store rainwater where it falls. Generally, high concentrations of impervious surfaces can exacerbate flooding conditions when stormwater infrastructure is not adequate.

Potential Cost: No cost to the City. Costs to developers may translate into higher housing costs.

Timeframe: 2030

Owner: Planning, Common Council

Co-benefits:   =

Strategy 3: Continue to monitor water quality of local lakes and streams in conjunction with County and State agencies (greenWP 4). Establish jurisdictional standards and identify funding sources to maintain and enhance local water quality. This includes the Hazard Mitigation Plan’s recommendation of considering desilting the Bronx River in partnership with the Bronx River Basin-Wide Watershed Advisory

Potential Cost: Moderate to significant

Timeframe: 2025 and ongoing

Owner: DPW

Co-benefits:  =

Strategy 4: Strive to increase biodiversity by maintaining and enhancing the City’s tree canopy (greenWP 5). Continue working with developers and property owners to plant native plants and pollinator habitats as landscaping with new and existing development.

Potential Cost: No additional cost to the City.

Timeframe: Ongoing

Owner: DPW

Co-benefits:  = 

Social Adaptation Strategies

The City of White Plains has taken measures to minimize climate change's impacts on communities

within the city. Some proposed actions focus on community outreach and education efforts, others seek to improve emergency communication efforts. Improving social infrastructure is necessary to ensure that communities can continue to enjoy the local natural environment and inhabit their communities. The social mitigation strategies listed below are drawn from the City's Hazard Mitigation Plan.

Strategy 1: Update the City's Emergency Response Plan. The City of White Plains aims to have the Office of Emergency Management update the ERP to reflect present capabilities and environment. The ERP will integrate information developed during the HMP update.

Potential Cost: Low cost to the City.

Timeframe: 2030

Owner: Planning, Public Safety

Co-benefits:  =

Strategy 2: Repetitive Loss Mitigation. The City of White Plains will continue to meet with property owners impacted by frequent flooding and will endeavor to develop mitigation plans including FEMA grant application where appropriate.

Potential Cost: Low cost.

Timeframe: Ongoing

Owner: Planning, Mayor's Office

Co-benefits: =

Strategy 3: Catch Basin Maintenance. The City of White Plains aims to continue to implement a program to check for drains in historically problems areas.

Potential Cost: Low cost to the City.

Timeframe: Ongoing

Owner: DPW

Co-benefits:  =

Strategy 4: Enhanced GPS Communication. The City of White Plains aims to continue to install GPS tracking and enhanced communications in all municipal vehicles to aid in dispatch work.

Potential Cost: Moderate

Timeframe: 2025 and ongoing

Owner: Public Safety, DPW

Co-benefits: =

Implementation

The table below is a timeline depicting all the adaptation strategies discussed above with implementation times. The purpose of this table is to help the City of White Plains keep track of all proposed adaptation strategies, and help communicate to stakeholders or community members when a proposed strategy may come into effect. Tracking strategy completion may help city officials

monitor associated changes (both negative and positive).

Timeline for Action	2025	2026	2027	2028	2029	2030
INFRASTRUCTURE						
Demand Response Programs	X	X	X	X	X	X
Improved insulation, passive cooling, shading, and cool roofs; ensuring that buildings housing vulnerable populations have adequate mechanical ventilation and cooling to adapt to extreme heat conditions				X	X	X
Relocating mechanical systems above flood levels, elevate buildings within flood prone areas, and reduce impervious surfaces outside of buildings to adapt to increased flooding risk				X	X	X
ENVIRONMENTAL						
Maintain and upgrade the City's stormwater management infrastructure	X	X	X	X	X	X
Establish an impervious surface definition in the Zoning Ordinance and develop regulations that limit coverage of a site to improve stormwater runoff and increase green space	X	X	X	X	X	X
Continue to monitor water quality of local lakes and streams in conjunction with County and State agencies	X	X	X	X	X	X
SOCIAL						
Update the City's Emergency Response Plan	X				X	
		X	X			
Repetitive Loss Mitigation	X			X	X	X
Implement a program to check for drains in historically problems areas.	X	X	X	X	X	X
Catch Basin Maintenance	X	X	X	X	X	X
Enhanced GPS communications in all municipal vehicles to aid in dispatch work.			X	X	X	X

Process, Implementation and Monitoring

Planning Process

Beginning in 2023, The CAPI team solicited input from a variety of sources to draft the vision statement. These outreach efforts are outlined in our public outreach and engagement strategy and include in-person meetings, in-person public outreach and a public survey that was made available to all residents of the community via email and on the municipal web site. The draft vision was shared with a broad swath of the community through tabling at multiple public parks during summer events and at several public events. A draft vision was included in the City of White Plain's 2024 Government Operations Climate Action Plan and was updated several times based on resident and staff feedback. According to the White Plain's 2024 Government Operations Climate Action Plan, the communities planning process considered diversity, equity, inclusion, and justice, and attempted to include frontline communities.

In 2024, the city participated in the CAPI Adapt program, a 12-month program designed to define and address vulnerabilities and recommend strategies to encourage adaptation. For more information on the CAPI Adapt Kick-off Workshop event see [HERE](#).

Included in the figure below are all communities within the City of White Plain's classified by New York State as disadvantaged ones. New York State defines disadvantaged communities as communities that may benefit from New York State's transition to greener sources of power, reduced pollution, economic opportunities, and cleaner air. Additionally, disadvantaged communities may also experience negative side effects of climate more frequently than surrounding communities⁵

⁵ "Disadvantaged Communities Criteria - New York's Climate Leadership & Community Protection Act." *NYSDERDA*, <https://climate.ny.gov/Resources/Disadvantaged-Communities-Criteria>. Accessed 17 July 2024.

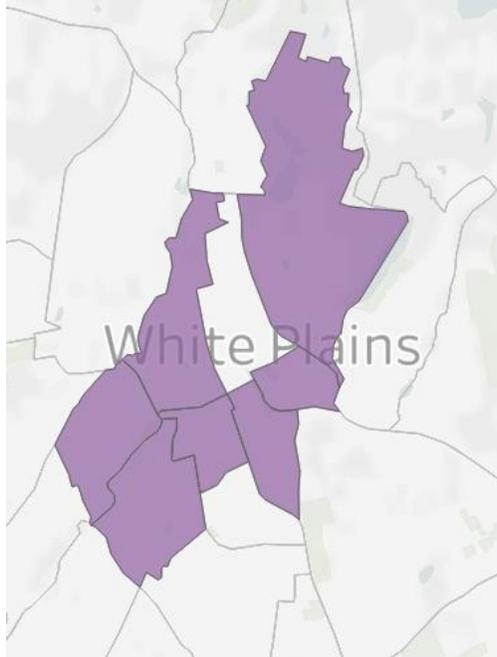


Figure 4: *Map of Disadvantaged Communities in the City of White Plains*

To address the uncertainties that extreme weather events may create, for both disadvantaged and other communities. The City of White Plains has two designated emergency shelters, the Post Road School and the other at White Plains High School. The emergency shelter housed within Post Road School can hold 150 people with backup power. The White Plains High School emergency shelter holds 500 people with backup power. The City of White Plains has also designated temporary housing locations at White Plains High School, White Plains Middle School (Highlands), White Plains Middle School, Cambria Hotel, Sonesta Hotel, and the Residence Inn. Temporary housing sites are designed to accommodate residents displaced by disasters.

Conclusion

This Climate Vulnerability Assessment integrates scientific data and the perspectives of residents and key groups regarding climate hazards in our community, county, and region. The Assessment outlines, analyzes, and prioritizes the impacts of priority climate hazards on key assets in the City of White Plains. Throughout the assessment, diverse and thoughtful feedback was received at each stage of the process. The assessment reflects the dedication of municipal officials, staff, the City's Council, commissions, and numerous residents to safeguarding identified unique and irreplaceable assets.

Acknowledging that perceptions and priorities evolve, the CAPI Adapt Team is dedicated to continuing the dialogue, as well as climate vulnerability, adaptation, and resilience planning. The next steps include determining and prioritizing adaptation strategies in a climate adaptation chapter of our Climate Action Plan. The authors are confident that this report will

inform and contribute to future municipal plans and development projects, aiding the City of White Plains in cost-effective and efficient climate adaptation efforts.

The City of White Plains commits to reviewing this Assessment at least once every seven years. A periodic review of the Assessment can help inform other municipal planning initiatives. Through ongoing dialogue, research, prioritization, reassessment, and planning, the authors envision this Climate Vulnerability Assessment as a living document, the cornerstone for a comprehensive Climate Action Plan, and a key component of our resilient vision guiding the City of White Plain's long-term sustainability efforts.

DRAFT

Appendix A: References

1 NOAA National Centers for Environmental Information, *Monthly Global Climate Report for Annual 2023*, published online January 2024, retrieved on February 7, 2024 from <https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202313>.

2 NOAA National Centers for Environmental Information, *Monthly National Climate Report for Annual 2023*, published online January 2024, retrieved on Jan 31, 2024 from <https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202313>.

3 Stevens, A., & Lamie, C., Eds. (2024). *New York State Climate Impacts Assessment: Understanding and preparing for our changing climate*. <https://nysclimateimpacts.org>.

4 Horton, R., D. Bader, C. Rosenzweig, A. DeGaetano, and W. Solecki. 2014. *Climate Change in New York State: Updating the 2011 ClimAID Climate Risk Information*. New York State Energy Research and Development Authority (NYSERDA), Albany, New York. <https://www.nyserdera.ny.gov/climaid>.

5 *Recommendations to Improve the Strength and Resilience of the Empire State's Infrastructure NYS 2100 COMMISSION* <https://www.cakex.org/sites/default/files/documents/NYS2100.pdf>.

6 Hudson, Scenic. "Sea Level Rise Mapper." ScenicHudson.Maps.Arcgis.Com, Scenic Hudson, <https://scenichudson.maps.arcgis.com/apps/MapJournal/index.html?appid=3a3d0dc3884c4637ad0a51f4aa912189>. Accessed 31 Jan. 2024.

7 Hope, ED. "Hazard Mitigation Plan- Westchester County, New York 2021", City of White Plains, 2021, <https://planning.westchestergov.com/images/stories/pdfs/HazardMitigation/96wp.pdf>. Accessed 11 July. 2024

8 *White Plains New York - Census Bureau Search*. <https://data.census.gov/all?q=White%20Plains%20New%20York>. Accessed 17 July 2024.

9 "Disadvantaged Communities Criteria - New York's Climate Leadership & Community Protection Act." *NYSERDA*, <https://climate.ny.gov/Resources/Disadvantaged-Communities-Criteria>. Accessed 17 July 2024.

Appendix B: Key Terms

Key climate adaptation terms from the [NY State Template for Local Climate Change Adaptation Plan](#), p. 13, are provided below for informational purposes. Not all are used in this document but are commonly used in climate adaptation work.

Adaptation (climate change): Actions that reduce the level of physical, social, or economic impact of climate change and variability, or take advantage of new opportunities emerging from climate change (Rosenzweig et al., 2011). It includes reducing the vulnerability of people, places, and ecosystems to the impacts of climate change.

Adaptive capacity: The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences (IPCC, 2014).

Climate change: A statistically significant variation in either the mean state of the climate, most often surface variables such as temperature, precipitation, and wind, or in its variability, persisting for an extended period (typically decades or longer) (Wuebbles et al., 2017).

Climate change effects: The physical effects of anthropogenic climate change, including changes in average temperatures, precipitation rates, sea level rise and ocean temperatures.

Climate change impacts: The impacts experienced by a human, natural system, or man-made system as a result of climate variation including physical changes in average conditions or extreme weather. Examples of climate change impacts include flooding of homes or ecosystem changes (Vogel et al., 2016).

Drought: A period of unusually persistent dry weather that persists long enough to cause a water supply shortage (NOAA, 2015).

Ecosystem-based Adaptation (EbA): The use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change (IPCC, 2014).

Ecosystem services: Ecological processes or functions having monetary or non-monetary value to individuals or society at large. These are frequently classified as (1) supporting services such as productivity or biodiversity maintenance, (2) provisioning services such as food or fiber, (3) regulating services such as climate regulation or carbon sequestration, and (4) cultural services such as tourism or spiritual and aesthetic appreciation (IPCC, 2014).

Exposure: The degree to which elements of a system are in direct contact with climate variables, may be affected by long-term changes in climate conditions or by changes in climate variability, including the frequency and magnitude of extreme weather (Rosenzweig et al., 2011).

Extreme heat: Individual days with a maximum temperature at or above 90°F or above 95°F; threshold used depends on the region within the state (Rosenzweig et al., 2011).

Extreme cold: Individual days with a maximum temperature at or below 32°F or below 0°F; threshold used depends on the region within the state (Rosenzweig et al., 2011).

Extreme precipitation: Event with more than 1, 2, or 4 inches of precipitation over a 24-hour period; threshold used depends on the region within the state (Rosenzweig et al., 2011).

Extreme weather: A period of abnormal weather conditions that can negatively affect humans, natural and man-made resources. Extreme weather is often used as an umbrella term referring to a combination of extreme heat, extreme cold, extreme precipitation, or extreme wind.

Extreme wind: Period with sustained or gusting wind speeds high enough to cause damage to trees, power lines, and other types of natural or man-made resources (NOAA, n.d.).

Flood or flooding: A temporary inundation of normally dry land area caused by an increase in water levels in nearby water bodies including lakes, rivers, estuaries, and oceans or by localized accumulation of precipitation (FEMA, 2017).

Greenhouse gas (GHG): Any gas that absorbs infrared radiation in the atmosphere; examples include carbon dioxide, methane, nitrous oxide, ozone, and water vapor.

Heat wave: Three consecutive days with maximum temperatures above 90°F (Rosenzweig et al., 2011).

Heat index: A measure indicating the level of discomfort for the average person is thought to experience as a result of the combined effects of the temperature and humidity of the air.

Maladaptation: Adaptive actions that may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future (IPCC 2014).

Mitigation (climate change): Actions that reduce the levels of greenhouse gases in the atmosphere; includes reducing emissions of greenhouse gases and enhancing sinks (things that absorb more greenhouse gases than they emit). Examples include switching to renewable energy sources and implementing energy efficiency measures.

Nature-based solutions (NbS): Actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits (IUCN, 2016).

Resilience: The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation (IPCC, 2014).

Sensitivity: How much a system is directly or indirectly affected by changes in climate conditions (e.g., temperature and precipitation) or specific climate change impacts (e.g., sea level rise and increased water temperature). If a system is likely to be affected as a result of projected climate change, it should be considered sensitive to climate change.

Vulnerability: The degree to which systems are susceptible to, and unable to cope with, adverse impacts of climate change (Rosenzweig et al., 2011). Generally, systems that are sensitive to climate and less able to adapt to changes are considered to be vulnerable to climate change impacts.