

V. CLIMATE CONDITIONS

Climate in the lower Hudson Valley is temperate and variable, from warm summers bringing occasional heat waves and droughts to cold, snowy winters. Climate change has already affected the normal variability in weather patterns and is projected to continue to significantly alter climate conditions in the future. It is important for municipalities to understand the risks posed by changing climate conditions and how they relate to local natural resources and human health, as well as to the built environment.

The New York State Energy Research and Development Authority (NYSERDA) has been studying, documenting, and modeling the impacts of climate change in New York State for several years. Climate trends and projections for the East Hudson and Mohawk River Valleys come from NYSERDA's Responding to Climate Change in New York State (ClimAID)¹. The New York Climate Smart Communities program² can suggest ways to put our Town's NRI in action for building climate resilience.

Two significant climate hazards are expected to affect Putnam Valley residents during the 21st century: increasing temperatures and changing precipitation patterns. These hazards may pose significant risks to natural resources and human communities, namely through heat waves, drought, flooding, and poor air quality. Recognizing the value of natural resources as "green infrastructure" in devising climate adaptation strategies is essential.

Temperature: Annual average temperatures have been steadily rising in New York State. Since 1970, they have been increasing at a rate of 0.6 degrees Fahrenheit (°F) per decade. In winter months, this warming effect is even greater, at 1.1°F per decade^{1,2}.

Models project that annual average temperature in the Hudson Valley region will rise by an additional 4 to 6°F by 2050; and 6 to 11°F by 2100 (see Table 1).

Table 1. Air Temperature Projections for the Lower Hudson Valley³

	Baseline 1971-2000	2020's	2050's	2080's	2100
Average air temperature (°F)	50	52.3 – 53.2	54.5 – 56.2	55.6 – 59.7	56.1 – 61.4
Increase in annual average (°F)	--	2.3 – 3.2	4.5 - 6.2	5.6 – 9.7	6.1 – 11.4

Changing Precipitation Patterns:

The Northeast has also experienced a 74% increase in the amount of precipitation occurring in heavy rainfall events between the periods of 1950-1979 and 1980-2009. Projections indicate that total annual precipitation could increase almost 15% by mid-century. In the future, Putnam Valley and other Hudson Valley communities can expect more dry periods intermixed with heavy rain events and decreased snow cover in winter (Table 2).

Table 2. Precipitation Projections for the Lower Hudson Valley³

	Baseline 1971-2000	2020's	2050's	2080's	2100
Total annual precipitation (inches)	51”	52 – 54.5”	53 – 57”	53.5 – 58.5”	53.5 – 61.5”
% Increase in annual precipitation	–	2 – 7%	4 – 12%	5 – 15%	5 – 21%
# Days with precipitation > 1 inch	10	14 – 15	14 – 16	15 – 17	–
# Days with precipitation > 2 inches	1	3 – 4	4	4 – 5	–

Climate Impacts in Putnam Valley:

These factors discussed previously will combine to create more frequent and severe heat waves (Table 3), short-term drought, and flooding (Table 4). These climate risks will affect human health in Putnam Valley directly as well as change habitats and associated biotic communities.

Table 3. Heat Wave Projections for the Lower Hudson Valley³

	Baseline 1971–2000	2020’s	2050’s	2080’s	2100
# Days per year above 90°F	10	26 – 31	39 – 52	44 – 76	–
# Days per year above 95°F	1	2 – 4	3 – 10	6 – 25	–
# Heat waves per year	1	3 – 4	5 – 7	6 – 9	–
Average # days of each heat wave	4	5	5 – 6	5 – 7	–
# Days per year ≤ 32°F	155	127 – 136	104 – 119	84 – 109	–

Table 4. Flood Projections for Coastal NY³

	Baseline 1971–2000	2020’s	2050’s	2080’s	2100
Increase in probability of 100-year flood	–	20 – 50%	70 – 190%	140 – 610%	–
Flood height of 100-year flood (feet)	15	15.3 – 15.7	15.9 – 16.8	16.5 – 18.3	–

New York’s changing climate presents new challenges and opportunities for communities. It is vital for our Town and county decision-makers to understand the community’s vulnerability to changing climatic conditions and consider natural resources as an important asset in planning for resilience, managing climate risks, and recovering quickly from extreme weather events. Changing precipitation patterns will necessitate redrawing of flood zones around area waterways. (See the **Streams and Watersheds** maps.) The incentive to build in areas of higher elevation to house families displaced from flood zones in the Town and greater region may put pressure on current areas of open space.

Putnam Valley has ecological assets that will contribute to its resilience, including large forest areas (see **Large Forests**), Wetlands (see **Wetlands**), and healthy streams (see **Stream Habitat and Aquatic Connectivity**). The Town’s forest habitats abut those in nearby areas providing corridors of connectivity (see **Regional Habitat Context**) that may help to preserve biodiversity in the face of a changing climate.

References

¹ Rosenzweig, C., W. Solecki, A. DeGaetano, M. O'Grady, S. Hassol, P. Grabhorn (editors). 2011. Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation. Synthesis Report. New York State Energy Research and Development Authority (NYSERDA), Albany, NY. nyserda.ny.gov/climaid

² *Climate Smart Communities*, New York State, climatesmart.ny.gov.

³ *Climate Projections In The Hudson River Estuary A Fact Sheet for the Public*, NYSDEC Hudson River Estuary Program, dec.ny.gov/docs/remediation_hudson_pdf/cphv.pdf.