

**COMMUNITY-BASED CLIMATE JUSTICE ASSESSMENT FOR THE
CITY OF PEEKSKILL
WESTCHESTER COUNTY, NEW YORK***

SEPTEMBER 2012

PREPARED BY

**CITY OF PEEKSKILL CLIMATE JUSTICE COUNCIL
HUDSON RIVER SLOOP CLEARWATER, INC.**

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Peekskill Climate Justice Council

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A. INTRODUCTION

Low income communities and communities of color have historically been overburdened as a result of air pollution from energy-generating facilities, small stationary sources, dense traffic, and water pollution from the disproportionate siting of locally undesirable land use practices.¹ For instance, studies have found that New York City residents in high asthma hospitalization areas were almost twice as likely to be African-American or Hispanic/Latino.²

To minimize further burdening these populations it is important that decisions with the potential to affect environmental justice communities consider the environmental and health impacts various public and private actions will have on these communities. In an effort to develop more robust and effective environmental justice policies and programs it is imperative to identify areas with disproportionately high rates of poverty, unemployment, traffic, and areas with greater concentrations of polluting facilities.³

Recognizing the importance of advancing these principles, Hudson River Sloop Clearwater, Inc. (Clearwater) submitted an Environmental Justice Grant to Environmental Protection Agency Office of Environmental Justice to examine various environmental and health impacts in four cities in the Hudson Valley. US EPA Office of Environmental Justice funded Clearwater to do this research and community outreach in Poughkeepsie, Kingston, Peekskill, and Beacon, communities that have been designated as Potential Environmental Justice Areas (PEJA). (See Attachment 1: NYSDEC Office of Environmental Justice Map of Potential Environmental Justice Areas.)

The project goal in the City of Peekskill changed from that of the other participating cities in that Peekskill had already developed a Community Based Environmental Justice Inventory (CBEJI) or Assessment under an earlier agreement with EPA. The goal in Peekskill, then became, to advance climate justice by creating a Climate Justice Assessment that would focus mainly on providing training to the community to facilitate

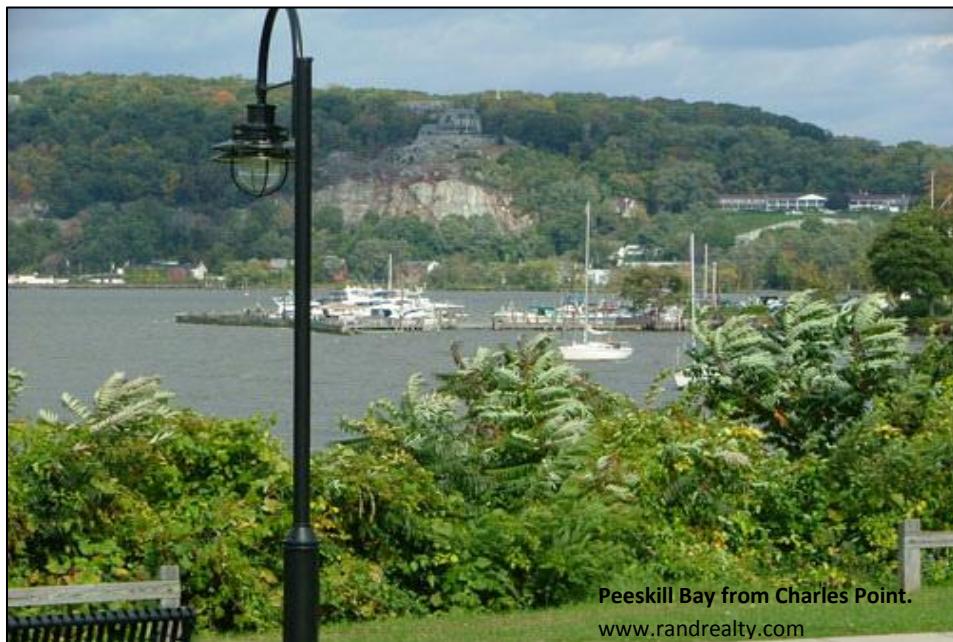
¹ New York State, "Environmental Justice Issue Brief, New York State Energy Plan 2009." December 2009. www.nysesenergyplan.com

² Schrager, Thomas F., Asthma and Air Pollution, Toxicology Source. 2009. www.toxicologysource.com/scitox/asthma.html; Miller, K.A., et al., Long Term-Exposure to Air Pollution and Incidence of Cardiovascular Events in Women. 365 New Eng J Med, (2007).

³ New York State, "Environmental Justice Issue Brief," op. cit.

the phase of project development. This CJ Council demonstrated to be a *sui generis* group mainly integrated by youth from the Youth Bureau and Hispanic community members from Comité Latino. Being able to work with these two important groups within the City of Peekskill represented a great accomplishment for project outcomes as it is known, for instance, that asthma disproportionately affects low-income communities and communities of color. Between 2003 and 2005, the age-adjusted asthma death rate among non-Hispanic Black New Yorkers and Hispanic New Yorkers was more than 4.6 times higher and 3.8 time higher, respectively, than that among non-Hispanic White New Yorkers.⁴

Most importantly, this report is the product of an iterative collaboration with an inclusive task force of community stakeholders that came to call itself the Peekskill Climate Justice Council and other interested community members and leaders. As such it depicts Peekskill's environmental values and concerns, and recommendations for future actions, including protecting existing assets, mitigating harms, and identifying further research needed. The goal is that this report will provide valuable information that will help Peekskill in future planning to protect impacted communities from further adverse climate impacts.



Peekskill Bay from Charles Point.
www.randrealty.com

⁴ Department of Health. "New York State Asthma Surveillance Summary Report." 2007. www.health.state.ny.us/statistics/ny_asthma/pdf/2007_asthmasurveillance_summary_report.pdf

B. CLIMATE JUSTICE INVENTORY

1. CLIMATE JUSTICE

According to the Mobilization for Climate Justice, “[c]limate justice is a vision to dissolve and alleviate the unequal burdens created by climate change. As a form of environmental justice, climate justice is the fair treatment of all people. It is the freedom from discrimination with the creation of policies and projects that address climate change, as well as the systems that create climate change and perpetuate discrimination.”⁵ The unequal burden refers to people of color and low-income located in urban communities across the United States. These communities are the first to experience the negative impacts of climate change such as heat-related illness and death, respiratory illness, infectious diseases, unaffordable rises in energy costs, and extreme weather.

1.1 Climate Justice in the Hudson Valley

Hudson River Sloop Clearwater, Inc. Hosts Climate Justice Conference in the Hudson Valley

On May 21, 2012 Hudson River Sloop Clearwater introduce the concept of Climate Justice to participating communities with an intermunicipal workshop on climate justice called "Finding Opportunity in the Climate Crisis." This well-attended and enthusiastic workshop brought together municipal leaders, community members, youth, and environmental/conservation committee members. Participants learned about environmental justice, how climate change will affect the Hudson Valley, and what current initiatives are taking place. After the speakers presented, the group split into breakout sessions to brainstorm on topics such as energy, food and water, transportation, disaster prevention, response and recovery, and economic opportunities/green jobs. At the end of the day, participants left with knowledge, ideas, and tools to bring back to their own cities.⁶

⁵ Mobilization for Climate Justice. "What is Climate Justice?" (2009). Retrieved October 7, 2011 from <http://www.actforclimatejustice.org/about/what-is-climate-justice/>

⁶ New York House. http://www.upstatehouse.com/view/full_story/14345709/article-Climate-Justice-Initiatives-Set-for-Hudson-Valley-Cities-July-6--7--12--14. Upstate House.

2. CLIMATE CHANGE

Climate change is one of the most controversial science issues of the 21st century and is a real and urgent challenge that is already affecting people and the environment worldwide. It is undeniable that the Earth's climate is changing. In this section we will present some key scientific facts that explain the causes and effects of climate change (see section C.3) in an attempt to demystify this sometimes misunderstood phenomenon.

2.1 What is Climate Change?

Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- natural processes within the climate system (e.g. changes in ocean circulation);
- human activities that change the atmosphere's composition (e.g. fossil fuel combustion) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.)

Although the Earth's climate has changed many times throughout its history, natural processes alone cannot explain the rapid warming seen today. Evidence of human influences on climate change has become increasingly clear and compelling.

Science

Climate or Weather

Weather is the way the atmosphere is behaving, mainly with respect to its effects upon life and human activities.

The difference between weather and climate is that weather consists of the short-term (minutes to months) changes in the atmosphere.

Energy from the sun drives the Earth's weather and climate. The Earth absorbs some of the energy it receives from the sun and radiates the rest back toward space. However, certain gases in the atmosphere, called greenhouse gases, absorb some of the energy radiated from the Earth and trap it in the atmosphere. (See Figure B.1 for an Image Illustrating the Greenhouse Effect). These gases essentially act as a blanket, making the Earth's surface warmer than it would be otherwise. (US EPA)

Climate Change and Global Warming

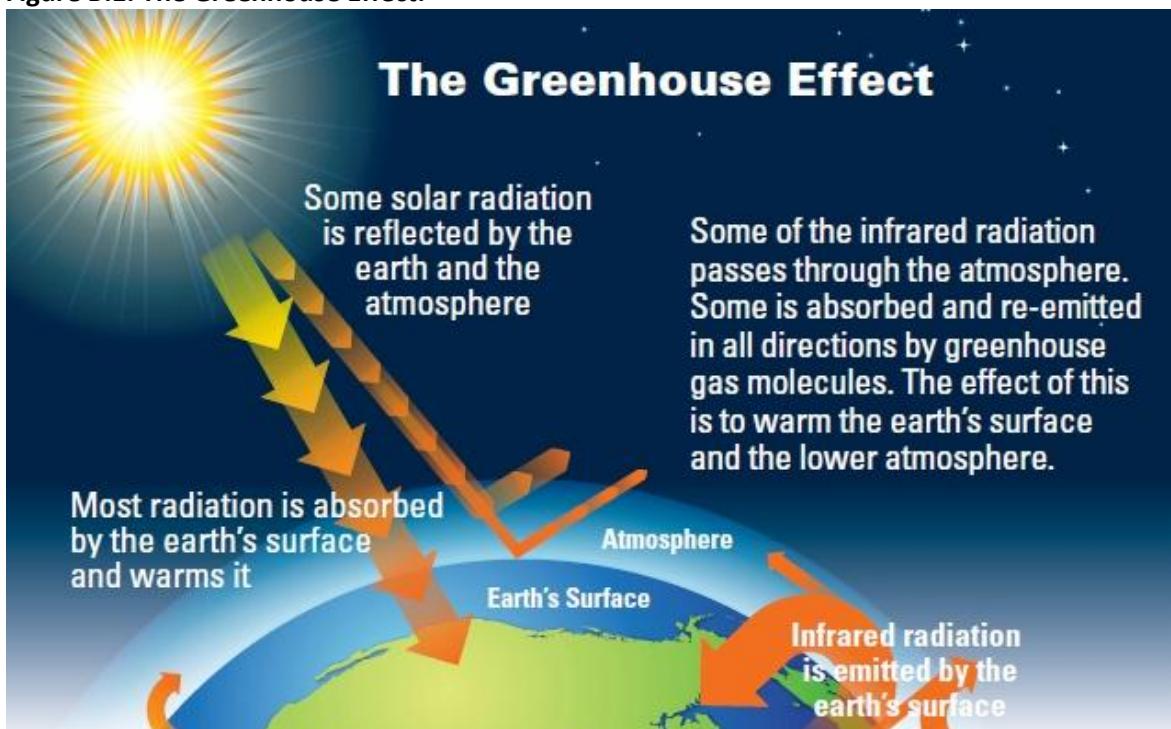
Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change might result from natural factors and processes or from human activities.

The term "climate change" is often used interchangeably with the term global warming. **Global warming** refers to an average increase in the temperature of the atmosphere near the Earth's surface, which can contribute to changes in global climate patterns. However, rising temperatures are just one aspect of climate change.

According to the National Academy of Sciences, "the phrase 'climate change' is growing in preferred use to 'global warming' because it helps convey that there are [other] changes in addition to rising temperatures."

Since the Industrial Revolution (around 1750), human activities have substantially added to the amount of heat-trapping greenhouse gases in the atmosphere. The burning of fossil fuels, such as coal and oil, and biomass (living matter such as vegetation) has also resulted in emissions of aerosols that absorb and emit heat, and reflect light.⁷ Some amount of greenhouse gases is necessary for making it possible for life as we know it to exist on Earth because they trap heat in the atmosphere keeping the planet warm and maintaining a healthy equilibrium. Therefore, an increase in the amount of greenhouse gases in the atmosphere changes its composition and influences climate. The natural greenhouse effect is being strengthened as human activities add more of these gases to the atmosphere.

Figure B.1. The Greenhouse Effect.



Source: US Environmental Protection Agency (EPA), "Frequently Asked Questions About Global Warming and Climate Change: Back to Basics," www.epa.gov (Feb. 5, 2012)

Greenhouse Gases

As mentioned before the Earth's climate is changing. Right now it is getting warmer, very likely⁸ the result of human activities.⁹ Although some greenhouse gases are almost entirely

⁷ EPA. "Causes of Climate Change." <http://www.epa.gov/climatechange/science/causes.html>

⁸ EPA using language from: IPCC, 2007: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning (eds.)]. (Use of "very likely" conveys a 90-99% chance the result is true. Other terms used to

man-made and others come from a combination of natural sources and human activities (See Carbon Dioxide below) their concentration in the atmosphere is changing the amount of radiation coming into and leaving the atmosphere, likely contributing to changes in climate.¹⁰

The major greenhouse gases emitted into the atmosphere through human activities are carbon dioxide, methane, nitrous oxide, and fluorinated gases.¹¹

- **Carbon dioxide (CO₂)** is emitted primarily through the burning of fossil fuels (oil, natural gas, and coal), solid waste, and trees and wood products. Changes in land use, such as growing new forests or disturbing soils, can lead to the addition or removal of carbon dioxide to/from the atmosphere. Carbon dioxide occurs naturally because of volcanoes, forest fires, and biological processes (such as breathing), but is also produced by burning fossil fuels in power plants and automobiles.

CO₂ concentrations in the atmosphere increased from approximately 280 parts per million (ppm) in pre-industrial times to 382 ppm in 2006, according to the National Oceanic and Atmospheric Administration's (NOAA) Earth Systems Research Laboratory; a 36 percent increase.¹² According to the 2007 IPCC, almost all of the increase is due to human activities.¹³ The current rate of increase in CO₂ concentrations is about 1.9 ppm/year. Present CO₂ concentrations are higher than any time in at least the last 650,000 years.¹⁴

- **Methane (CH₄)** is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and agricultural practices and from the decay of organic waste in municipal solid waste landfills. In the United States, the largest methane emissions come from the decomposition of wastes in landfills, ruminant digestion and manure management associated with domestic livestock, natural gas and oil systems, and coal mining.¹⁵

communicate confidence include "extremely likely" (greater than 95% chance the result is true); "likely" (greater than 66% chance the result is true) and "extremely unlikely" (less than 5%). The term "virtually certain" conveys that there is a greater than 99% chance that a result is true.)

⁹ Id.

¹⁰ Atmosphere Changes. <http://www.epa.gov/climatechange/science/recentac.html>

¹¹ US EPA. Climate Change Indicators in the United States. Greenhouse Gases. at 9.

¹² <http://www.esrl.noaa.gov/gmd/ccgg/trends/index.html#global>

¹³ IPCC, 2007: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning (eds.)]

¹⁴ Id.

¹⁵ US EPA. Sources and Emissions: Where Does Methane Come From? <http://www.epa.gov/methane/sources.html>

Methane is more abundant in the Earth's atmosphere now than at any time in at least the past 650,000 years.¹⁶ Methane concentrations increased sharply during most of the 20th century and are now 148% above pre-industrial levels. In recent decades, the rate of increase has slowed considerably.¹⁷

- **Nitrous oxide (N₂O)** is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

N₂O has increased approximately 18 percent in the past 200 years and continues to increase. For about 11,500 years before the industrial period, the concentration of N₂O varied only slightly. It increased relatively rapidly toward the end of the 20th century.¹⁸

- **Fluorinated gases**, such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, are emitted from a variety of industrial processes and commercial and household uses. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances such as chlorofluorocarbons (CFCs).

Many of these gases can remain in the atmosphere for tens to hundreds of years after being released.¹⁹ Thus, to get a more complete picture of the amount of greenhouse gases in the atmosphere, both emissions (how much of a given greenhouse gas is produced and emitted into the air) and concentrations (the amount of a greenhouse gas present in a certain volume of air) are measured. Long-lived greenhouse gases become globally mixed in the atmosphere, reflecting both past and recent contributions from emission sources worldwide.²⁰ Some short-lived greenhouse gases, such as tropospheric ozone and aerosols, as well as particulates in the atmosphere, such as black carbon and sulfates, are relevant to climate change.²¹ Other major sources of greenhouse gases include industrial and agricultural processes, waste management, and land use changes.

¹⁶ EPA, Causes of Climate Change. <http://www.epa.gov/climatechange/science/causes.html#ref3>

¹⁷ EPA. Greenhouse Gases: Methane. <http://www.epa.gov/climatechange/science/recentac.html>

¹⁸ Ibid

¹⁹ Id.

²⁰ Id.

²¹ Id.

2.2 Climate Change Indicators

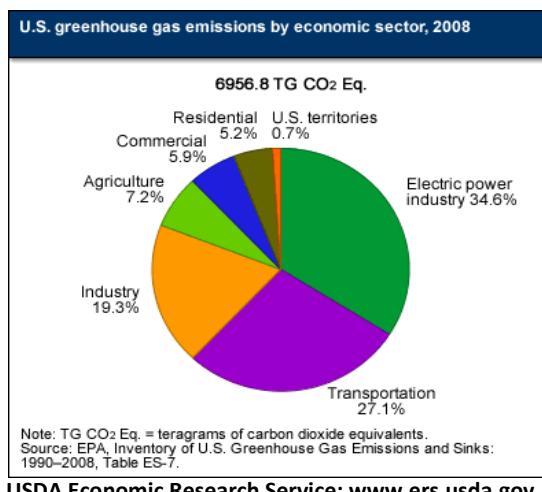
As reported by the IPCC, the buildup of greenhouse gases in the atmosphere is likely the cause of most of the recent observed increase in average temperatures, and contributes to other factors of climate change.²²

Collecting and interpreting environmental indicators has played a critical role in our increased understanding of climate change and its causes.²³ An indicator represents the state of certain environmental conditions over a given area and a specified period of time.²⁴ Scientists, analysts, decision-makers, and others use environmental indicators, including those related to climate, to help track trends over time in the state of the environment, key factors that influence the environment, and effects on ecosystems and society.²⁵

The EPA selected the 24 indicators presented in this report from a broader set of 110 indicators, many of which were identified at an expert workshop (November 30 to December 1, 2004) on climate change indicators convened by the National Academy of Sciences and funded by the EPA. The indicators in this report were chosen using a set of screening criteria that considered usefulness, objectivity, data quality, transparency, ability to show a meaningful trend, and relevance to climate change.

U.S. Greenhouse Gas Emissions

Greenhouse Gas Emissions in the United States have risen 14 percent from 1990 to 2008.²⁶ These greenhouse gases include carbon dioxide, methane, nitrous oxide, and several fluorinated compounds, and are released into the atmosphere by human-related commercial, industrial and household activities.²⁷ Electricity generation accounts for 32% of U.S. emissions since 1990, followed by transportation (27%).²⁸



²² IPCC (Intergovernmental Panel on Climate Change). 2007. Summary for Policymakers. In: Climate change 2007: The physical science basis (Fourth Assessment Report). Cambridge, United Kingdom: Cambridge University Press.

²³ US EPA, Climate Change Indicators Report. Available here www.epa.gov/climatechange/indicators.html. Feb 20, 2012.

²⁴ Id.

²⁵ Id.

²⁶ Id.

²⁷ Id

Global Greenhouse Gas Emissions and Atmospheric Concentrations

From 1990 to 2005, global greenhouse gas emissions have risen by 26 percent.²⁹ These emissions are increasing faster in some parts of the world that are highly industrialized and have high amounts of pollution. Before the industrial era around 1780, carbon dioxide concentrations measured about 270-290 parts per million (ppm) as compared to 387 ppm in 2009 - a 38 percent increase.³⁰

Climate Forcing

Climate or ‘radiative’ forcing is a measurement of how substances like greenhouse gases affect the amount of energy naturally absorbed by the atmosphere. An increase in this forcing leads to climate warming and from 1990 to 2008 the cumulative greenhouse gases in the Earth’s atmosphere caused climate forcing to increase by 26 percent.³¹ Most of this increase is due to an increase in carbon dioxide emissions and in this eighteen year period, radiative forcing due to carbon dioxide increased by 35 percent.³²

U.S. and Global Temperature

By looking at average monthly and yearly temperatures in the past century, we can see how increases in average temperatures coincide with patterns of climate change. Since 1901, global average surface temperatures have risen at an average rate of 0.13 °F per decade.³³ Prior to 1970, the U.S. rate of temperature increase was in line with the global trend but since then the United States has warmed at almost twice the global rate. Trends show that 2000-2009 was the warmest decade on record worldwide.³⁴

Heat Waves

Heat waves in the United States have increased since the 1960s and 1970s, but the highest frequency of heat waves occurred during the 1930s ‘Dust Bowl.’³⁵ Heat waves are typically in conjunction with periods of intense drought when little soil moisture cannot regulate the

²⁸ Id

²⁹ Id

³⁰ Id

³¹ Id

³² Id

³³ Id

³⁴ Ibid

³⁵ Ibid

evaporation process. Heat waves are known to kill or injure crops and livestock and can lead to power outages when high demand for air conditioning can short-circuit the power grid.³⁶

Drought

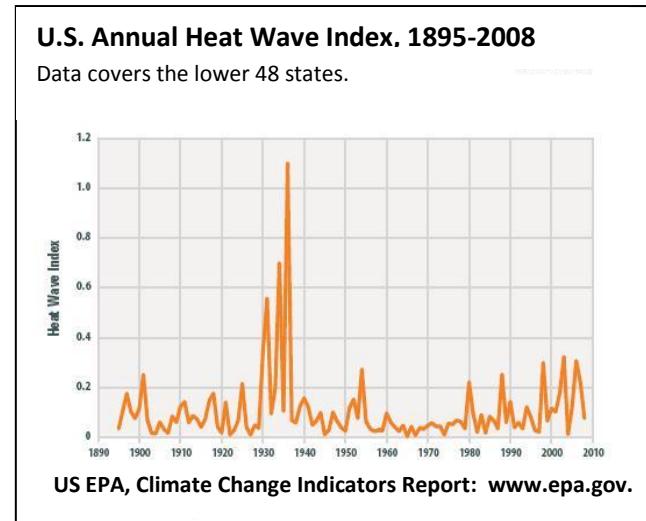
As average surface temperatures rise, the Earth's water cycle speeds up and increases evaporation. An increase in evaporation usually results in a decrease of precipitation, causing drought. From 2000 to 2009, roughly 30 to 60 percent of U.S. land areas experienced drought conditions.³⁷ Data regarding patterns of drought have not been recorded long enough to determine any long-term trend, yet average increases in surface temperature suggest that drought has increased with climate change.³⁸

U.S. and Global Precipitation

Total rainfall and precipitation have significant effects on human and ecosystem life. Since 1901 global precipitation has increased at an average of 1.9 percent per century, while precipitation has increased by 6.4 percent per century in the United States.³⁹ While the increase in precipitation rates are in direct reflection of the climate change, shifting weather patterns have decreased the total precipitation in some areas, including Hawaii and parts of the south-west.⁴⁰

Heavy Precipitation

Climate change can influence the intensity as well as the incidence of precipitation. Warmer oceans increase the amount of water evaporated into the air and this warmer air can hold more moisture that is released in the form of heavy rain and snowstorms.⁴¹ Not only have precipitation rates per century increased, but incidences of heavy short-term precipitation have also



³⁶ Id

³⁷ Id

³⁸ Id

³⁹ Id

⁴⁰ Id

⁴¹ Id

increased since 1990. Eight of the top ten years for extreme one-day precipitation have occurred in the past two decades.⁴²

Tropical Cyclone Intensity

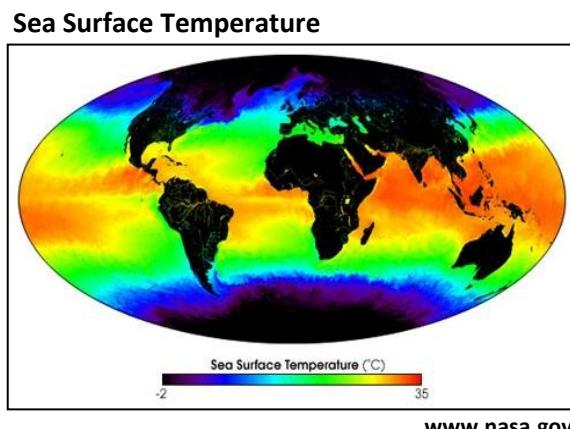
Tropical cyclones are cyclones that garner their energy from warm tropical oceans. A cyclone's intense rains and winds can cause property damage, soil erosion, and flooding.⁴³ Increased sea surface temperatures that result from climate change are the primary cause of cyclone formation and behavior. While there is no clear trend of cyclone intensity in the past half century, levels of intensity have risen in the past 20 years or so, and six of the ten most intense years have occurred since the mid-1990s.⁴⁴

Ocean Heat

When sunlight hits the ocean's surface, some of the energy is captured and stored as heat and affects both the deep ocean's temperature as well as the surface temperatures. Ocean heat has substantially increased since 1950 and has affected not only surface temperatures, but also sea levels and currents.⁴⁵

Sea Surface Temperature

Sea surface temperatures have significantly increased in the past century, and from 1901 to 2009 the average temperature rose at a rate of 0.12 degrees per decade. In the past 30 years, sea surface temperatures have been shown to rise more quickly at 0.21 degrees per decade.⁴⁶



Sea Level

Changes in sea surface temperature affect sea levels. From 1870 to 2008, absolute sea level increased at an average rate of 0.06 inches per year but in the past decade or so, from 1993 to 2008, average sea level rose at a rate of 0.11 to 0.13 inches per year - almost twice as fast as the long-term pattern.⁴⁷ Regional trends in sea level vary and have actually decreased in some

⁴² Id

⁴³ Id

⁴⁴ Id

⁴⁵ Id

⁴⁶ Id

⁴⁷ Id

places because the sea level is relative to the height of the land, which itself has shifted in the past few decades.

Ocean Acidity

Changes in ocean waters develop over a period of time. Over the past decades studies show that the acidity level in oceans has increased substantially due to the abundant level of carbon dioxide. As levels of carbon dioxide increase in the atmosphere the ocean waters absorb more carbon dioxide in order to keep a balance.⁴⁸ Although carbon dioxide can be stored in oceans to help lessen climate change caused by human activity the significant increase has caused a chemical imbalance, which can change the biodiversity and productivity of the ocean's ecosystem.⁴⁹ Sensitive organisms such as plankton and corals can be greatly affected due to the reduced level of calcium carbonate to harden their skeletons and shells. This balance between the atmosphere and the ocean can take up to hundreds of years to correct itself.

Arctic Sea Ice

During the cold winter months sea ice covers nearly all of the Arctic Ocean, but in the summer months with warm temperatures the sea ice begins to melt. The extent of the sea ice has, even in winter months, has begun to decrease over the past century. Since sea ice is reflective, this region usually helps regulate the global climate keeping the polar region cold.⁵⁰ However, due to the decrease in sea ice caused by the increase in temperatures, the balance of the Earth's climate is reduced.⁵¹ The decreased amount of sea ice can be harmful to Arctic mammals such as polar bears and walruses. These animals strongly rely on the existence of sea ice to hunt, breed, and migrate.⁵² In 2007, the lowest extent of sea ice was recorded as 490,000 square miles, which is an area larger than Texas and California combined.⁵³

Glaciers

A glacier is a large body of ice that has accumulated over a period of time and is present year round.⁵⁴ Glaciers naturally flow like a river, but much slower. Higher elevations build up snow which is compressed into ice over time, and water flows at lower elevations until volume is

⁴⁸ Id

⁴⁹ Id

⁵⁰ Id

⁵¹ Id

⁵² Id

⁵³ Id

⁵⁴ Id

eventually lost.⁵⁵ A balance between higher and lower elevations with the presence of fresh snow is always met resulting in glaciers neither growing nor shrinking.⁵⁶ Therefore, the appearance of glaciers changing or melting and breaking off relates to the change in climate. Observations over a period time are calculated to indicate the mass balance of glaciers around the world. A negative mass balance will determine that glaciers are losing ice and snow.⁵⁷ Therefore, a cumulative negative mass balance signifies that glaciers are melting faster than they can be recharged by snow precipitation.⁵⁸ Since 1960, glaciers worldwide have lost more than 2,000 cubic miles of water, which correlates with the increase in sea levels.⁵⁹

Lake Ice

The disappearance of winter ice in the spring relates to climate factors such as temperature, wind, and cloud cover.⁶⁰ A shorter lifespan of lake ice in the spring months may be a sign that the climate is warming.⁶¹ Changes in lake ice can affect the life cycles of the plant and animal species present there. A decrease in ice cover can cause higher water temperatures, lower water levels, higher light penetration, and increased evaporation.⁶² These conditions all correlate with the thaw dates trending toward earlier ice break up in the spring.

Snow Cover

Snow cover is influenced by many climate factors, most importantly the changes in global temperature and precipitation over time. The amount of snow cover can affect heating and cooling trends globally. Snow has a higher albedo because it is light and reflective causing cooler temperatures in these areas, whereas darker surfaces such as asphalt or open waters have a lower albedo retaining more heat causing warmer temperatures. Snow cover is also important in replenishing local streams and rivers, and plants and animals rely on the snow for insulation and protection. Over a climate period trends have indicated that snow cover has decreased throughout North America.⁶³

⁵⁵ Id

⁵⁶ Id

⁵⁷ Id

⁵⁸ Id

⁵⁹ Id

⁶⁰ Id

⁶¹ Id

⁶² Id

⁶³ Id

Snow Pack

Snow pack is the amount of snow that is accumulated on the ground over a period of time.⁶⁴ As temperature increases, precipitation levels also change, resulting in more rainfall than snowfall, and causing the snow pack to decrease and melt earlier in the spring. Snow pack is vital for mountainous areas because during the winter months the snowfall stores water that melts in the spring and is used for drinking supplies, irrigation, and power.⁶⁵ If these trends occur earlier, agriculture, tourism, and wildlife will be greatly affected.⁶⁶ Certain species of plants and animals that rely on the snow pack for insulation from the freezing temperatures may be negatively affected by its decrease.

Heat-Related Deaths

Heat-related deaths in the United States are the leading cause of weather-related fatalities. This can be prevented through outreach interventions, education, air quality management, and health care. Extreme temperatures can cause serious illnesses such as heat stroke, hyperthermia, heat cramps, and heat exhaustion.⁶⁷ Recently, with increased temperatures, heat wave events are becoming more prevalent. The number of people over the age of 65 has increased at a steady rate due to the baby boomers, and this age group is at the highest risk of heat-related deaths.⁶⁸ Elderly people are more sensitive to excessive heat conditions, and people who have serious cardiovascular and respiratory diseases are more susceptible to be affected as well.

Length of Growing Season

The length of growing season is defined by the number of days when plant growth takes place, ranging usually from the last frost of the spring to the first frost of the fall.⁶⁹ Many climate factors are taken into consideration when defining this term due to the maturity of plants, daylight hours, temperature, rainfall, and frost days.⁷⁰ Warming climates can have a positive or negative effect on crop yield depending on location and type of crop. Also, invasive species or weed growth can alter the length of growth season. Throughout North America, over the last climate period,

⁶⁴ Id

⁶⁵ Id

⁶⁶ Id

⁶⁷ Id

⁶⁸ Id

⁶⁹ Id

⁷⁰ Id

there has been a steady increase in the growing season, more so in the western US than the east.⁷¹

Plant Hardiness Zones

Plant hardiness zones are regional designations that help farmers and gardeners determine which plant species are expected to survive a typical winter.⁷² This designation is determined based on the average low temperatures recorded each winter due to the fact that low temperatures affect plants more so than do higher temperatures. Therefore, as temperatures increase globally plant species are able to thrive in areas that were previously too cold. This can have many effects on growing patterns and agriculture production. Animal species may migrate or emigrate depending on climate change and new invasive plant species can harm native plants.⁷³ Plant hardiness zones have shifted northward over time from 1990 to 2006 due to warmer winter temperatures.⁷⁴

Leaf and Bloom Dates

The natural events of leaf and bloom dates (when plants begin letting out their leaves and flowers in spring) are affected by climate change. Some factors that can affect these events are temperature, light, rainfall, and humidity.⁷⁵ Warming trends have been correlated with the earlier arrival of spring and this has many impacts on ecosystems and human society.⁷⁶ The earlier spring arrives, the longer the growing season is, which means a longer allergy season, more invasive species and pests. The early occurrence of lilacs and honeysuckles is a great indicator of climate change because they have such a large geographical range that over the years blooming has occurred a few days earlier. Plants in New York are blooming as much as eight days earlier than they did in 1970.⁷⁷

Bird Wintering Ranges

Animal behavior is a strong indicator of climate change, especially among birds. Birds' life cycles can be altered by climate change events particularly during reproduction and migration.⁷⁸

⁷¹ Id

⁷² Id

⁷³ Id

⁷⁴ Id

⁷⁵ Id

⁷⁶ Id

⁷⁷ Id

⁷⁷ NYS DEC, "Climate Change Basics." <http://www.dec.ny.gov/energy/63848.html>.

⁷⁸ EPA, Climate Change Indicators Report. www.epa.gov/climatechange/indicators.html.

Birds have been observed over a long period of time because they are easy to count and identify. Most birds migrate north to breed and feed for the summer and during the winter months migrate south to warmer temperatures. Changes in habitat choice of certain bird species can be an indicator of climate change due to the fact that conditions in these habitats have changed, causing them to become more or less favorable for the species. Precipitation and temperature fluctuations have caused many bird species to move further north for the summer and less south for the winter. Birds that traditionally breed in New York have migrated as much as forty miles further north in the past two decades.⁷⁹ Also, climate change can alter the timing of life cycle changes, and birds that do not adapt to the change can suffer a decline in population.⁸⁰

3. ACTUAL AND POTENTIAL CLIMATE CHANGE IMPACTS

If global warming emissions continue to grow unabated, New York State can expect dramatic changes in climate during the course of this century, with substantial impacts on the state's economy and character.⁸¹

3.1 Temperature

Average temperatures across the Northeast have risen more than 1.5 degrees Fahrenheit (°F) since 1970, with winters warming most rapidly. Due to emissions in the recent past, average temperatures across the Northeast are projected to rise another 2.5 to 4 degrees Fahrenheit (°F) in winter and 1.5°F to 3.5°F in summer above historic levels over the next several decades. The extent and severity of climate change beyond the mid-21st century, however, will be determined by emissions choices we make now—in the Northeast and around the world.⁸²

If heavy reliance on fossil fuels and heat-trapping emissions continue, New York cities can expect a dramatic increase in the number of days over both 90°F and 100°F. Cities across the Northeast are projected to average 20 days per summer over 100°F and some (such as Philadelphia and Hartford, CT) could average nearly 30 such days. The length of the winter

⁷⁹ Id.

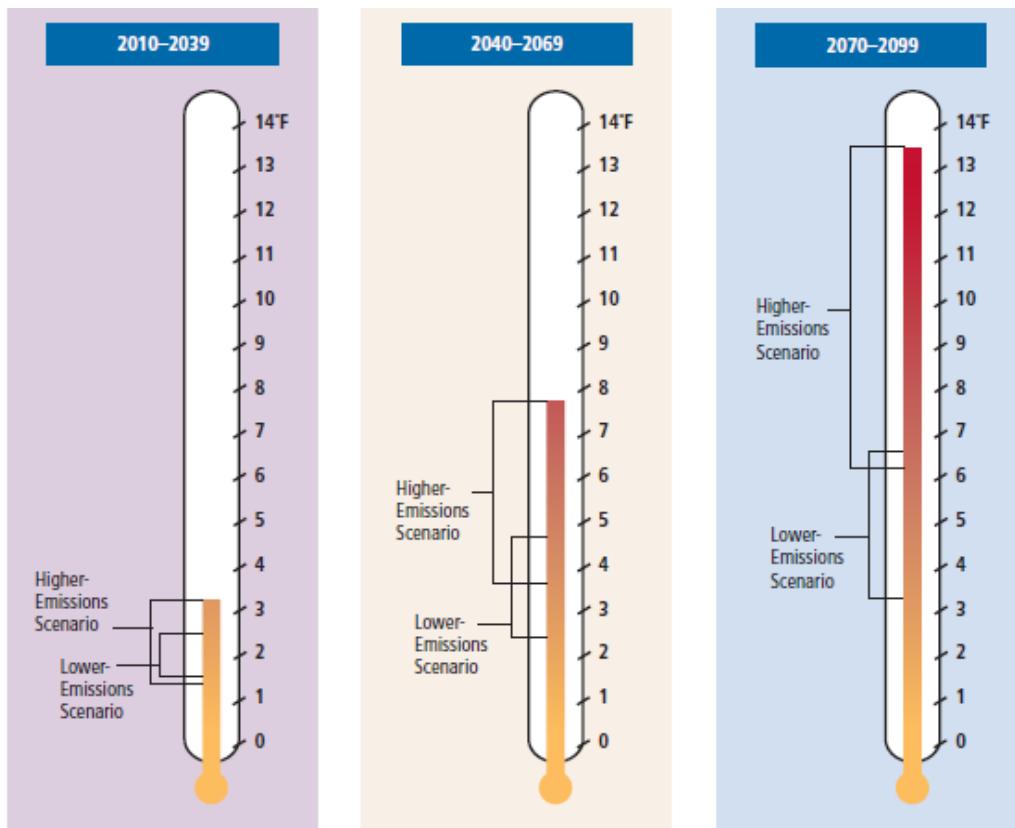
⁸⁰ Id.

⁸¹ Frumhoff, P.C., J.J. McCarthy, et. al. July 2007. *Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions*. Synthesis report of the Northeast Climate Impacts Assessment (NECIA). Cambridge, MA: Union of Concerned Scientists (UCS).

⁸² Id.

snow season could be cut in half across Maine, New Hampshire, northern New York, and Vermont.⁸³

Figure C.2 - Changes in Regional Average Summer Temperature



Projected increases in regional average temperatures for three time periods.

www.climatechoices.org.

3.2 Health Impacts

Climate change affects human beings in many different ways; directly through changing weather patterns, and indirectly through its impact on the quality and quantity of the food and water we consume, the air we breathe, and the natural environment in which we live.⁸⁴

One large impact of climate change is the actual changing of temperature on the planet. Since 1901, global average surface temperatures have risen at an average rate of 0.13°F per decade,

⁸³ Id.

⁸⁴ IPCC: Intergovernmental Panel on Climate Change document (IPCC, 2007)

but since 1970 this warming has occurred at nearly twice this rate.⁸⁵ An increase in temperature could lead to direct and adverse effects on human health, ranging from increased heat waves and incidents related to them, to climate-sensitive vector-borne diseases.

Heat waves are a serious effect of climate change, especially in urban areas. The IPCC predicts that extreme heat events will increase in frequency and duration due to global warming and that these events will have greater effects on humans due to factors such as continued urbanization and heat island effects, a larger proportion of the population being over 65 years old, and the number of people living alone.⁸⁶

Another serious health-related impact of climate change is the increase in climate-sensitive diseases. The term “climate-sensitive disease” refers to food-borne, water-borne, or animal-borne diseases caused by the transmission of pathogens through these three vectors, which can all be affected by change in climate.⁸⁷ Climate-sensitive diseases are very prevalent in warm areas around the planet, particularly those that are carried by mosquitoes and other relevant insects. A few examples of climate-sensitive diseases are malaria, yellow fever, encephalitis, and dengue fever. Also, in these warmer climates where the temperatures are much higher, there are usually much higher rainfall patterns which cause the disease to be more prolonged and frequent. Flooding and runoff caused by stormwater can cause contamination of drinking water and crops by pathogen-containing sewage. Lyme disease and West Nile virus are two other examples of animal-borne diseases, both of whose vectors (ticks and mosquitoes, respectively) are positively affected by increased temperatures.⁸⁸

3.3 Sea Level Rise

One of the most dramatic effects of climate change is its impact on sea level rise. Over the past century, sea level rose by an average rate of 1.7 millimeters a year, or 0.7 inches a decade, and based on recent observations, it is believed that this rate is accelerating.⁸⁹ Conservative projections estimate a rise of 7 to 23 inches by the year 2100, while more recent

⁸⁵ EPA, “U.S. and Global Temperature”. <http://www.epa.gov/climatechange/science/indicators/weather-climate/temperature.html>

⁸⁶ EPA, “Aging Initiative – Extreme Heat Events”.

<http://www.epa.gov/aging/resources/climatechange/extremeheatevents.htm>

⁸⁷ EPA, “Human Health Impacts & Adaptation”. <http://www.epa.gov/climatechange/impacts-adaptation/health.html#impactsdiseases>

⁸⁸ Ibid

⁸⁹ NYS DEC, “Sea Level Rise”, <http://www.dec.ny.gov/energy/45202.html>

studies, which take a closer look at the rapid melting of land-based ice sheets (namely Antarctica and Greenland), suggest that the sea level could rise as much as 55 inches by the same year.⁹⁰

Increasing sea level has a number of impacts on human beings, directly and indirectly, as well as numerous impacts on the natural environment. Human-related impacts of sea level rise in the United States include increased flooding of populated coastal cities and towns and the infrastructure damage that results, potential contamination of salt water into freshwater and drinking water sources, as well as an increased risk of waterborne illnesses due to sewage overflows and pollutants entering the water supply. There are several other non-human related impacts of sea level rise as well, which are also important to consider, namely coastal erosion, and the destruction of important coastal ecosystems such as beaches, tidal marshes, swamps, bogs, mangroves, and other coastal wetland habitats.⁹¹

New York State, having a large amount of its population living in coastal areas, would therefore be greatly affected by this drastic increase in sea level. According to the NYS Sea Level Rise Task Force, 62% of the state's population lives in coastal areas, or areas that would be directly affected by sea level rise, including, geographically, the Capital Region/Upper Hudson Valley, the Mid-Hudson Valley (including Beacon), the Lower Hudson Valley, New York City, and Long Island.⁹² The Task Force also projects the sea level in New York Harbor to rise by as much as fifteen inches in the next 150 years, which would in turn affect the entire Hudson River estuary area.⁹³ Based on the ClimAID Integrated Assessment 2010, this could cause a potential water-level rise of 5-10 inches for the majority of the Hudson Valley as soon as the year 2020.⁹⁴

The City Peekskill, being located right on the Hudson River, is therefore at risk of being affected by sea level rise. The city's main industrial buildings, both current and old, are mostly located near the riverfront and as a result, much of the physical land of the waterfront has started to

⁹⁰ Ibid

⁹¹ EPA "Climate Change – Northeast Impacts and Adaptation", <http://www.epa.gov/climatechange/impacts-adaptation/northeast.html#ImpactsPrecipitation>

⁹² NYS Sea Level Rise Task Force – Report to the Legislature Dec. 2010.
http://www.dec.ny.gov/docs/administration_pdf/slrtffinalrep.pdf

⁹³ Ibid

⁹⁴ NYSERDA, "Responding to Climate Change in New York State – Technical Report",
<http://www.nyserda.ny.gov/Publications/Research-and-Development/Environmental/EMEP-Publications/~/media/Files/Publications/Research/Environmental/EMEP/climaid/11-18-response-to-climate-change-in-nys-introduction.ashx>

erode. In recent years, a new initiative was taken up to revitalize the waterfront. Heavy stones were placed in strategic areas to help stabilize them in order to prevent further erosion.

Many of the city's public recreation areas, including Riverfront Green Park, Peekskill's premier waterfront park, with excellent views of the Hudson Highlands and extensively used park facilities, Charles Point and the Peekskill Shoreline Trail are also located in proximity to the waterfront, and could be damaged or lost with an increase in the river level. In 2009 the City of Peekskill adopted The Waterfront Trail and Park Master Plan after extensive public input and serves as a guide for future park improvements along the Hudson River shoreline from McGregory Brook to Lent's Cove. The Site Reconnaissance Report provides an overview of existing conditions of the shoreline in 2009.⁹⁵ (See Attachment 2 for a Copy of this Report). This revitalization covers a significant area of the Peekskill shoreline, from Lents Cove to Riverfront Green Park and implementation require employing shoreline stabilization measures, specifically at McGregory Brook. The Peekskill Climate Justice Council having identified these public areas as important assets for the community is concerned that current plans are not considering how current climate projections might affect this development. (See Attachment 3 for an Image of Current Hudson River Projections in Peekskill).

3.4 Environmental Effects

Water Quality and Climate Change

Freshwater resources are highly sensitive to variations in weather and climate. The changes in global climate that are occurring as a result of global warming will affect patterns of freshwater availability and will alter the frequencies of floods and droughts.⁹⁶ Climate model simulations suggest that "total flows, probabilities of extreme high or low flow conditions, seasonal runoff regimes, groundwater-surface water interactions, and water quality characteristics could all be significantly affected by climate change over the course of the coming decades."⁹⁷

Although changes in the climate are certain to occur, there are significant uncertainties regarding the specific nature of the local and regional impacts of climate change on hydrologic regimes. Nevertheless, some types of changes can be foreseen with relatively high confidence. For example, it is currently projected that in watersheds where stream-flow currently depends

⁹⁵ Water Front Trail and Park Master. www.cityofpeekskill.com

⁹⁶ Dr. Kathleen Miller. Climate Change Impacts on Water. http://www.isse.ucar.edu/water_climate/impacts.html

⁹⁷ Id.

on snowmelt, warmer temperatures will increase the percentage of precipitation falling as rain rather than as snow, causing the annual spring peak in runoff to occur earlier.⁹⁸ Depending on changes in the amount and seasonal distribution of precipitation, these watersheds may experience an increased likelihood of winter flooding and reduced late summer flows. Also, saltwater intrusion into coastal aquifers is likely to become an increasing problem as a result of sea-level rise, and for many watersheds, there will be an increased likelihood of warmer summer water temperatures with associated impacts on aquatic ecosystems and water quality.

The Hollowbrook is a stream that runs from Kent to Peekskill. The watershed is the valley area covering 48 square miles of land and 20 tributary streams including most of Putnam Valley and portions of Kent in Putnam County, and northern sections of Cortlandt and Yorktown in Westchester County.⁹⁹ The City of Peekskill owns the Wiccopée Reservoir at the northern end of the watershed, which has pure clean drinking water. The Hollowbrook serves to carry water from the reservoir and tributaries to a pump station in Cortlandt near Pump House Road and Oregon Road. Water is pumped up the hill to the city's water plant off Frost Lane, where it is tested, filtered and treated before being distributed to about 21,000 residents of Peekskill, Cortlandt and Buchanan.

The Northern Westchester Joint Water Works, pipes water from the Hollowbrook system to 23,000 additional residents in Cortlandt and Yorktown to supplement water from NYC's reservoir system to ensure a year-round supply of water. Additionally, hundreds of homes and businesses in Putnam Valley, along the Hollowbrook and tributary streams, use private wells to supply their drinking water.

The Hollowbrook is an important and sensitive water resource and is vulnerable to climate impacts. Currently nonpoint source (NPS) pollution, caused by rainfall or snowmelt moving over and through the ground, is the leading remaining cause of water quality problems. As extreme weather increases it can be potentially expected that events, where runoff pick up and carry away natural and human-made pollutants, depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water, will increase. Some of the pollutants that can be carried into the Hollowbrook and other important water resources include:

⁹⁸ Water Cycle Study Group (K. Miller member), A Plan for a New Science Initiative on the Global Water Cycle, U.S. Global Change Research Program, Washington, D.C., 2001.

⁹⁹ Hollowbrook Water Watch. www.hollowbrookww.org

- “Excess fertilizers, herbicides, and insecticides from agricultural lands and residential areas;
- Oil, grease, and toxic chemicals from urban runoff and energy production;
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- Salt from irrigation practices and acid drainage from abandoned mines;
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems”.¹⁰⁰



Surface Water Resources, Hollowbrook Watershed. www.hollowbrookww.org

¹⁰⁰ Id.

Also important for the community is the McGregor Brook located at the northern point of the Riverfront Green Park. The lower segment of the channel just above the confluence with the Hudson River has experienced heavy erosion, due to the mixing and churning that occurs during storm events when the tide is rising, the general tidal and wave action and the lack of woody vegetation atop the bank.¹⁰¹

Air Quality and Climate Change

In the Environmental Section of this report we have discussed the effect air quality has on the Earth's climate. This section explores climate impacts from air pollution.

As previously discussed, ozone and particle pollution are strongly influenced by shifts in the weather (e.g., heat waves or droughts). Based on projected future climate scenarios, and in the absence of additional emissions reductions, the IPCC projected "declining air quality in cities" in the future as a result of climate change. Furthermore, the EPA concluded in 2009 that greenhouse gas emissions "may reasonably be anticipated both to endanger public health and to endanger public welfare." This finding was based, in part, on the potential for climate change to worsen air quality in the U.S., and the accompanying public health impacts that would result.¹⁰²

Climate change could have the following impacts on national air quality levels:

- "produce 2-8 ppb increases in summertime average ground-level ozone concentrations in many regions of the country."
- further exacerbate ozone concentrations on days when weather is already conducive to high ozone concentrations
- lengthen the ozone season
- produce both increases and decreases in particle pollution over different regions of the U.S."¹⁰³

The City of Peekskill is already overburdened by pollution from traffic, mainly due Route 9.¹⁰⁴ The Briarcliff-Peekskill Parkway, which runs from the Saw Mill River Parkway and NY 100 in Hawthorne to US 9 in Ossining, is a hybrid limited-access and at-grade highway. Designed by

¹⁰¹ Id.

¹⁰² United States Environmental Protection Agency. *Climate Change and Air Quality*. www.epa.gov/airtrends.

¹⁰³ Id.

¹⁰⁴ CBEJI. www.clearwater.org

the Westchester County Parks Commission to relieve traffic on Albany Post Road (US 9), the parkway was constructed by the New York State Department of Public Works (NYSDPW).

From the Saw Mill River Road (NY 100) split in Briarcliff Manor, the Briarcliff-Peekskill Parkway continues in a northerly direction to just north of Ryder Road in Ossining, where it makes a sharp turn west toward US 9.

According to the New York State Department of Transportation (NYSDOT), the Briarcliff-Peekskill Parkway carries approximately 35,000 vehicles per day (AADT). Although the route has retained the low-clearance, stone arch overpasses and sight lines of a traditional parkway, it is open to commercial traffic.¹⁰⁵

Agriculture and Climate Change

Agriculture is highly sensitive to climate variability and weather extremes. Increases in temperature and carbon dioxide (CO₂) can be beneficial for some crops in some places, but to realize these benefits, nutrient levels, soil moisture, water availability, and other conditions must also be met. Climate change could make it more difficult to grow crops, raise animals, and catch fish in the same ways and same places humans have done in the past.¹⁰⁶ Projected temperature increase could directly threaten livestock. A number of states have each reported losses of more than 5,000 animals from just one heat wave.¹⁰⁷ Over time, heat stress can increase vulnerability to disease, reduce fertility, and reduce milk production, and drought may threaten pasture and feed supplies.¹⁰⁸

New York is a leading agricultural state, worth \$4.42 billion in 2008. This income is then added to the economy in a variety of ways, including: \$427 million in employee compensation, \$343 million in energy cost, \$236 million in property taxes, \$188 million in maintenance & repairs, and \$133 million in marketing & transportation.¹⁰⁹

Despite its high urban influence, over 6,000 acres of farmland are located within the Westchester Agricultural District, and Westchester remains an important player in New York State agriculture. Westchester County farms have consistently outperformed the national

¹⁰⁵ Briarcliff Peekskill Parkway. www.nycroads.com

¹⁰⁶ United States Environmental Protection Agency. *Agriculture*. www.epa.gov.

¹⁰⁷ United States Environmental Protection Agency. *Climate Change Impacts and Adapting to Change*. www.epa.gov.

¹⁰⁸ Id.

¹⁰⁹ Farm Bureau of New York. About New York Farm Bureau. <http://www.nyfb.org>. This information is provided by USDA's National Agricultural Statistics Service and the NYS Department of Agriculture and Markets.

average growth in sales revenues in recent years, and it is led by the greenhouse, nursery, and equine sectors. Westchester is also one of the state's largest producers of tomatoes, has one of the fastest growing greenhouse sectors, and is home to the highest valued equine sector in the state. Farming is also important to the general economy through its linkages to other industries and its employment effects. Every dollar in total farm output leads to an additional 42 cents in local economic activity. The location of Westchester County within the New York metropolitan market means outstanding opportunities for high value agricultural niche products.¹¹⁰ Thus, it is important to consider adaptation measures to mitigate potential harms to this important local industry.

Energy and Climate Change

Changes in temperature, precipitation, sea level, and the frequency and severity of extreme events will likely affect how much energy is produced, delivered, and consumed in the United States.

The U.S. Department of Energy led the development of a report published by the U.S. Global Change Research Program that investigates the impact of climate change on energy production and use in the United States.¹¹¹ The report summarizes the ways climate change will affect how Americans produce and use energy by answering the three questions found below, included here with a brief summary of the answers provided in the report:

“How might climate change affect energy consumption in the United States?”

Studies indicate that climate warming will mean reductions in total U.S. heating requirements and increases in cooling requirements for buildings varying by region and season, but they will affect household and business energy costs and their demands on energy supply institutions. Generally, changes will imply increased demands for electricity, which supplies virtually all cooling energy services but only some heating services.¹¹²

“How might climate change affect energy production and supply in the United States?”

¹¹⁰ Agriculture and Farmland Protection Board of Westchester County

¹¹¹ United States Environmental Protection Agency. *Energy Impacts and Adaptation*. www.epa.gov.

¹¹² Wilbanks, Bhattacharyya et.al. *Effects of Climate Change on Energy Production and Use in the United States*. A Report by the U.S. Climate Change Science Program and the subcommittee on Global Change Research. Department of Energy, Office of Biological & Environmental Research, Washington, DC., USA, 160 pp (2007).

Climate change could affect energy production and supply (a) if extreme weather events become more intense, (b) where regions dependent on water supplies for hydropower and/or thermal power plant cooling face reductions in water supplies, (c) where temperature increases decrease overall thermoelectric power generation efficiencies, and (d) where changed conditions affect facility siting decisions. Most effects are likely to be modest except for possible regional effects of extreme weather events and water shortages.¹¹³

Might climate change have other effects that indirectly shape energy production and consumption in the United States?

It appears that climate change is likely to affect risk management in the investment behavior of some energy institutions, and it is very likely to have some effects on energy technology investments and energy resource and technology choices. In addition, climate change can be expected to affect other countries that in turn affect U.S. energy conditions through their participation in global and hemispheric energy markets. U.S. energy policy can be expected to suffer some changes too.

Other Potential Impacts.

- Climate change could affect the amount of water available to produce electricity or extract fuel. In areas where water is already scarce, competition for water between energy production and other uses could increase.
- Sea level rise and more frequent intense storms could disrupt energy production and delivery by damaging electricity infrastructure, fuel delivery infrastructure and equipment, power plants, or storage facilities.¹¹⁴

Also, important to consider as indicated in the CBEJI, is that Indian Point Generating Units 2 and 3 is located in Buchanan, just south of Peekskill and sits within the 10 mile radius from Peekskill. The plant generates over 2,000 megawatts of electrical power, comprising as much as 30 percent of the electricity used in New York City and Westchester County. Indian Point itself is located within several feet of the Hudson River and thus is potentially vulnerable to

¹¹³ Id. at 1.

¹¹⁴ *Supra*, note 14.

noticeable changes in water level. Although impacts of this type are unlikely it is important to consider in the creation of this climate justice profile of the City of Peekskill.

3.5 Public Services

Emergency Response and Preparedness

Emergency Medical Services, Fire Department, has seven Emergency Medical Technicians and eight Paramedics on its career staff. These members run back up to the Peekskill Community Volunteer Corps. and to the Cortlandt Regional Paramedic program. Peekskill is part of the Westchester County Mutual Aid System and has responded to Croton, Ossining, Lake Mohegan, Buchanan, Continental Village, Garrison and other communities who requested its assistance.¹¹⁵ Peekskill also has a specialized team called FAST response team. This team is called into other communities during structure fires and its sole responsibility is to search and rescue down or troubled firefighters.

The members of the Peekskill Fire Department are all very dedicated individuals who put their lives on the line for our community each and every time the alarm sounds. Many with no compensation give an enormous amount of time and energy to the City. The Peekskill CJ Council acknowledges the hard work of these men and women, and the great asset and value they bring to the community daily, whether it be fighting fires, performing building inspections or teaching fire prevention.

3.6 Public Lands and Recreation

The City of Peekskill has a number of recreational areas, many of them located in the waterfront area.

The parks are:

- China Pier at Charles Point provides an expansive view of Peekskill Bay on up to Bear Mountain, and the Bear Mountain Bridge. It was used by the Fleischmann Company to import the raw materials at its vast yeast and gin factory. Now, it hosts the tall ships during Peekskill Celebration and provides a great spot for a picnic and river watching.
- Depew Park is home to the City Recreation Office. You can enjoy a swim in Veterans Memorial Pool or walk on the many wooded trails. It offers the community a picnic pavillion

¹¹⁵ City of Peekskill. Emergency Medical Services. www.cityofpeekskill.com

overlooking Lake Mitchell and horseshoe court. There is also a basketball court, tennis courts, a bocce ball court and a playground.

- Franklin Park is located on Franklin Street between Smith Street and Simpson Place. Its facilities include a basketball court, playground, a ballfield, and several park benches.
- South Avenue Park: Located at the corner of 9D and South Avenue, has tennis and basketball courts.
- Lepore Park is located on Main Street in Peekskill and Has a basketball court and a spray pool on a hot summer day.
- Peekskill Stadium on Louisa Street is a state of the art baseball field complex overlooking the Hudson River It has a basketball court and food is available at the concession stand.
- Riverfront Green Park presents visitors with a backdrop of the Hudson Highlands, kayakers, swans and occasional barges. This is an ideal spot to river watch. Many special events are held during the year. This is also the object of the Riverfront Revitalization Plan mentioned above.
- Tompkins Park is home to the Lapolla Little League. The baseball field is accessible from Main Street (Route 6) and games are played throughout the spring and summer. There is also a playground and basketball courts which are accessible from the Park Street entrance.



Charles Point, Peekskill, NY. Photo by Charles Hayes. www.peekskill.com

Conclusions and Recommendations

The potential effects and impacts of climate change are clearly widespread and encompass a great variety of issues that affect both human beings and their natural environment. Whether it be the physical effects on humans, such as the threat of increasing sea levels and its impact on coastal cities and their infrastructures, the health effects that come along with climate-sensitive diseases, changes in agriculture and nutrition, and food-borne diseases, or the effects climate change has on the world's natural ecosystems, it is clear that this is an issue that cannot be overlooked.

Community education is one of the most important measures that need to be taken in dealing with climate change. The fact that climate change is occurring is more or less unanimously agreed upon by the scientific community, and it is important now, more than ever, to continue to further educate the public and increase understanding of these issues, and help local communities prepare for the impacts of climate change.

In terms of local communities, such the City of Peekskill, it is vital to realize that dealing with climate change on the city level is not only possible, but extremely important. This could entail developing new projects and/or refining old projects directed at local scale climate change adaptation and mitigation (see section C.3). These projects could be implemented by cities throughout the world on a regional scale to help communities focus on and realize their true potential in helping deal with the effects of climate change. In Peekskill for example, this may entail directing new development within the city away from the waterfront area, and developing projects to elevate, relocate, or physically protect important city structures close to the waterfront, as well as devising maps to show areas that are affected by flooding caused by stormwater runoff and storm surges from the Hudson River.¹¹⁶

Another important step in helping the public to realize the issues related to climate change and the impacts it has on their daily lives and futures is to make the information more easily accessible. This means not only providing the documents and data containing the information, but helping to make it more easily understandable, and helping to convey the information in a way that the public can more easily relate to.

Finally, it is vital to educate and expand on the knowledge of local decision makers and politicians of the impacts of climate change on both the global and local levels. It is key to get the support of these people in local communities who have the actual ability to implement these ideas and projects in their cities.

Climate change, though a global issue, has definite solutions on a regional, even local, scale. Dealing with climate change through mitigation and adaptation projects at the local level is beneficial due to the fact that each city or local community feels and handles the repercussions

¹¹⁶ NYS Sea Level Rise Task Force – Report to the Legislature Dec. 2010.
http://www.dec.ny.gov/docs/administration_pdf/slrtffinalrep.pdf

of climate change in different ways. This allows the community to address its own specific needs in terms of climate resilience and deal with them on an individual basis. Through these mitigation/adaptation projects, increased community and public education and awareness on the impacts of climate change, and providing city officials and decision makers with the ways and means to implement the changes in their community, climate change can continue to be combated throughout the United States, and the world as a whole.