NYSERDA Climate Change Adaptation Projects

Responding to Climate Change in New York State (ClimAID)

Columbia University/Cornell University/City University of New York
  Complete

The ClimAID assessment was undertaken to provide decision-makers in New York State with cutting-edge information on the state's vulnerability to climate change and to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge. The assessment acknowledges the need to plan for and adapt to climate change impacts in a range of sectors: water resources, coastal zones, ecosystems, agriculture, energy, transportation, telecommunications, and public health.

ClimAID developed climate projections for seven regions of New York State (which were updated in 2014), assessed the impacts of those potential changes on the eight sectors, and discussed potential adaptation strategies, economic costs, and environmental justice issues for those sectors.

https://www.nyserda.ny.gov/climaid

Delineation of Coastal Erosion Hazard Areas (CEHAs)

Stony Brook University's School of Marine and Atmospheric Sciences
  Complete

This project will upgrade a number of New York State's Coastal Erosion Hazard Area (CEHA) maps, which delineate property and buildings at risk from future erosion in the coastal regions of the state.

Downscaled Projections of Extreme Rainfall in NYS (IDF Curves)

Cornell University's Dept. of Earth and Atmospheric Sciences, Ithaca
  Complete

New York State transportation infrastructure design standards to withstand severe weather have not been updated since the 1960s. Yet, climate change forecasts call for increased periods of heavy rain, with more flood potential. This project will provide more accurate models of projected increases in rain intensities across the state, which will help engineers design infrastructure with better capacity to withstand future rainfall.

http://ny-idf-projections.nrcc.cornell.edu/idf_viewer.html

Flood Mapping Visualization Tool for Planners and Storm Surge Modeling

Columbia University's Center for International Earth Science and Information Network & Stevens Institute of Technology
  Complete—extension in progress to enhance tool

Working with the Stevens Institute of Technology, the proposers will map potential flood zones along the Hudson Valley from Westchester to Troy under future sea level rise and storm surge scenarios. It is expected that, due to rising sea levels and more significant rain, these areas close to the Hudson River could be at increased risk of flooding. The team will create a free, publicly-available online tool to help coastal communities understand their potential risk, with a focus on infrastructure such as railroads, wastewater treatment plants and power plants.

http://www.ciesin.columbia.edu/hudson-river-flood-map/

Floodplain Mapping with Sea Level Rise

Dewberry
  Complete

This project will study potential flood zones in the Hudson Valley and on Long Island, using a different modeling method than the Columbia project. The two projects will allow a comparison of modeling methods to better inform future assessments.

http://services.nyserda.ny.gov/SLR_Viewer/About

Toolkit for Spatial Prioritization of Conservation Investments

The Nature Conservancy, Albany and Syracuse
  Complete

The project will map impacts of climate and land use change on the state's natural resources and wildlife. The project will create tools to help natural resource managers adapt to these changes, and maintain the benefits these resources currently provide to communities and future generations of New Yorkers.

http://maps.naturalresourcenavigator.org/#

Marsh Migration Modeling with SLAMM

Warren Pinnacle Consulting, Waitsfield, VT
  Complete

This project will predict how wetlands along New York State's coastlines may move and change due to sea-level rise. The results will help land-use planners identify appropriate adaptation strategies for these marshes and nearby areas.

http://warrenpinnacle.com/prof/SLAMM/NYSERDA/ -- report, raw data

http://slammview.org/ -- maps

Integrating SLAMM results and stakeholder priorities to define marsh adaptation strategies

Warren Pinnacle
  Complete

Building on the previous SLAMM project, this project will better incorporate roads and infrastructure into the analysis, better visualize marsh migration pathways, and develop a decision-support tool that will assist decision makers in planning adaptation strategies for marsh conservation and coastal community resiliency. The study area will consist of NYC, Westchester County, and Nassau County.

http://warrenpinnacle.com/prof/SLAMM/NYSERDA2015/index.html

Heat-Related Vulnerability and Cooling Center Assessment

New York State Department of Health, Center for Environmental Health, Albany
  Estimated completion: early 2018

The researchers will identify segments of New York's population, such as the elderly, who will be facing health risks due to the projected increased intensity and duration of heat waves. The study also aims to assess the effectiveness of current programs, such as heat warning systems and "cooling centers" in the state.

https://www.health.ny.gov/environmental/weather/vulnerability_index/index.htm

https://apps.health.ny.gov/statistics/environmental/public_health_tracking/tracker/index.html#/CCMap

Climate Change and Water Quality - Impacts and Adaptation Strategies for NYS Utilities

Hazen and Sawyer PC, NYC
  Complete

The project will study the impact of climate on the character and concentration of natural organic matter in drinking water sources located throughout New York State.   Rising temperatures and extreme weather events can alter levels of natural organic matter, which can lead to increases in water treatment costs and hazardous disinfection byproducts.

Results will help water treatment centers prepare for future water quality issues as a result of climate change.

NYS Climate Change Science Clearinghouse

NESCAUM / ESF / Cornell
  Complete

The New York Climate Change Science Clearinghouse (NYCCSC) is providing an objective, user-friendly, Web-based repository of data and literature for climate change science. NYCCSC will help educate policymakers, provide practitioners the specific climate information they need, help identify data gaps, and promote information sharing across scientific and engineering disciplines. Information flow is bi-directional, with users providing data, documents, and other content that will be reviewed and approved prior to publication on the NYCCSC. The site is both leveraging and improving upon the capabilities of existing climate-related sites at state, regional, and federal levels.

https://www.nyclimatescience.org/

Impact of Weather-Related Power Outages on Health & Assessment of Climate Adaptation
Strategies

Fund for Public Health in New York
  Estimated completion: mid 2018

This project will assess the relationship of power outages/infrastructure disruptions to public health, as well as the relationship of food-borne illnesses to climate change; identify vulnerable populations; and assess and develop appropriate response strategies. The project will better identify the link between the energy and health sectors, and will help inform short- and long-term climate adaptation measures for outages under future climate.

Capturing Waste Heat from Biogas-powered Generators for Cooling Dairy Cows

Cornell University, Ithaca
  Estimated completion: mid 2018

A novel cooling system to reduce heat stress in dairy cattle will be developed in this project. Using the waste heat produced by an existing, on-site biogas generation system, the project will use an absorption heat exchanger to capture waste heat and generate a stream of chilled fluid that will run below cow bedding. The objective is to maintain or reduce power consumption on the farm while helping to protect cattle during heat waves, which can reduce animal health and milk production.

Transportation Infrastructure Vulnerability
Dewberry Engineers
 Estimated completion: mid 2018

This project will develop a criticality assessment approach for transportation that would address the diversity of the state, reducing the "urban bias" of the existing methodology. The project will also identify transportation infrastructure at risk from increasing debris-load impacts, and design guidance to reduce the risk. The results will support NYSDOT's efforts to build infrastructure resilience to climate change and will be essential to informing transportation adaptation decision-making in addressing climate vulnerabilities to NYS's infrastructure.

Climate Change Impacts on NYS's Buildings Sector
SUNY Buffalo
 Estimated completion: end 2018

This project will investigate the impacts of climate change on the buildings sector in NYS, as well as explore potential   adaptation strategies. The project will fill an identified gap in the ClimAID project.

ap.buffalo.edu/adapting-buildings

A Building-Resiliency Assessment for the New York City Housing Authority
DNV GL
 Estimated completion: end 2018

The primary objective of this study is to conduct a climate change building resiliency assessment for the New York City Housing Authority (NYCHA) using the B-READY building resiliency assessment tool. The project will develop the proof of concept for residential buildings, initial case studies, and an improved assessment tool that aligns with New York State interests based on the partnership with NYCHA. The project will use an on-site assessment and interview process to   determine a building's readiness to withstand various climate-related events. The tool will be improved using characteristics of the NY market, then initially applied to ten NYCHA-owned buildings in NYC. The project will also include a community engagement task to address environmental justice issues not typically included in resiliency studies, which would serve as the basis for adding a social impacts module to the B-READY tool. The recommendations   resulting from the tool will identify probable implications with respect to cost, operations, and occupants.

Building Footprint Data for Climate Change Adaptation
CIESIN/Columbia University
 Estimated completion: end 2018

The project will compile a complete set of building footprint and critical infrastructure data for all counties adjacent to the Hudson River from the southern border of Westchester County to the Federal Dam at Troy, and Long Island, as well as complete an impact damage assessment. The team will create building footprint data when existing data is not available. By allowing local and regional decision-makers, as well as property owners, to easily access information about the risk of their properties, the results will help address concerns related to structure vulnerability over the most densely developed areas of the state. The results could help decision makers with policy decisions, impact assessments, planning efforts, and potential adjustments to local codes.

Flood Impacts and Adaptation Strategies: Filling Data Gaps in Upstate and Western New York

CIESIN/Columbia University
  Estimated completion: end 2018

This research project will produce a complete set of building footprint and critical infrastructure data in riverine flood zones for all 45 counties in upstate and western New York. As with the previous project on downstate New York, this project will integrate the building footprint and critical infrastructure data with current property assets data from the New York State Office of Real Property Services and evaluated for potential flood impacts in accordance with data produced from FEMA on flood risk. Once completed, the analysis will be combined with ongoing NYSERDA-funded work to create a statewide database of building footprints, critical infrastructure, potential impacts, and mitigation strategies. The data will be made available through a previously developed web mapping tool and as fully compliant and interoperable web services.

Using Remote Sensing to Evaluate Current and Future Vulnerability to Eutrophication and Algal Blooms

Hazen and Sawyer
  Estimated completion: end 2018

The project will create publicly available tools for water utilities, water resource agencies and non-profits, regulators, recreational water managers, and the broader research community to track watershed conditions that lead to harmful algal blooms, using NASA-provided satellite data. The project will also provide an analysis of adaptation options to target the primary watershed processes that drive harmful algal blooms under current and future climate conditions. The tools developed can be used to provide both near-term and long-term predictions of harmful algal blooms, which can then be used to determine appropriate adaptation actions for controlling nutrients and managing watersheds under current and future climate.

Shoreline Resilience Planning for East Hampton

Dewberry Engineers
  Estimated completion: end 2018

This project will serve as a demonstration on how to inform resilient coastal policy, permitting, and management practice through improved data resources and understanding of short- and long-term coastal processes. The project will create a shoreline-structure inventory, analyze shoreline change and sediment processes, and work with the Town of East Hampton to develop adaptation recommendations with respect to sea level rise.

Effects of Climate Change on Renewable Energy Distribution in NYS

SUNY Albany
  Estimated completion: end 2018

NYS is aggressively integrating greater amounts of renewable energy into the power grid. Climate change, however, will likely affect current generation and the future distribution of renewable energy resources on a spectrum of temporal and spatial scales. This project will develop a quantified, probability-based study of the redistribution of the wind, solar, and hydropower resources across the state under future climate change; analyze near- and mid-future scenarios for changes in the state's potential renewable energy distribution and variability; and determine how the future availability and redistribution of those resources will affect the State's efforts to meet targeted renewable energy generation and GHG reduction goals. The results will help utilities, State agencies, local, state, and regional planners, and the NYISO to better understand how climate change will affect the availability and distribution of renewable energy resources, assisting with deployment of future renewable energy sources to ensure NYS meets its goals.

Developing Community-Focused, Climate-Informed Decision Support Tools for Flood Risk in New York State

Abt Associates
  Estimated completion: end 2018

This project will develop and implement a flexible framework for using multiple sources of data to estimate potential changes in future flood likelihood. The project will develop a set of integrated tools that can help communities bridge the gap between scientific uncertainty and adaptation to potential increases in flood risk. The project will synthesize available climate and hydrologic information from multiple sources to estimate a reasonable range of future climate- based flood projections for two pilot communities, then work with the communities to inform their decision-making processes. Since projections of change in New York's climate vary considerably, a precise forecast of how flooding will change cannot be provided; instead, the focus will be to develop a framework to aid communities in developing sound decisions in the face of this uncertainty. The result will be a screening-level assessment, which will help communities decide where they could invest more resources in a more detailed vulnerability and adaptation study.

Climate Change Vulnerabilities of and Adaptation Strategies for NYS's Future Electric System

Electric Power Research Institute (EPRI)
  Estimated completion: end 2019

New York's REV, Clean Energy Standard, 80x50, and other drivers will result in a fundamental transformation of New York's electricity system over the coming decades. At the same time, this future electricity system will need to operate under a climate different than today's. This study will assess the vulnerability of NYS's future electric system to a changing climate and analyze the role of various adaptation strategies, taking into account the transition to a de-carbonized electric grid and other socioeconomic drivers. The project results will help inform the efficient deployment of the large capital investments necessary to transform the electricity system over the coming decades, help policymakers and electricity planners assess system performance, vulnerabilities, and adaptation strategies under a future climate, and will be helpful in designing an electricity system for NYS that is resilient to climate change, meets policy objectives, and keeps electricity rates down.

Open-Source Tropical Cyclone Risk Modeling for New York State

Columbia University
  Estimated completion: end 2019

This research project consists of developing and implementing an open-source model for estimating New York State tropical-cyclone risk under present and future climate conditions. The model will combine statistical and physics-based components that represent the complete storm lifetime: genesis, track, intensity, landfall, and surface wind field.

Working prototypes of the intensity and wind models already exist; this work will develop the genesis and track models and further improve the intensity and wind models. The main outcomes will include both software tools and ready-to-use information.

Coastal Resiliency and Morphodynamic Responses to Storm Surge and Seiche in Eastern Lake Erie

SUNY Stony Brook
  Estimated completion: end 2019

Climate change is expected to result in more powerful, more frequent, and longer-duration storms in the Great Lakes basin, and more severe storms are accompanied with larger storm surge and waves. Lake Erie is well-known for high storm surge and especially for its low-frequency oscillations known as *seiches*, which can cause flooding and erosion in coastal areas. Changing climate is anticipated to intensify seiche impacts in coastal areas through larger and more frequent events. This project will develop a modeling framework that will lead to a better understanding of current and future seiche events and impacts in Lake Erie.

Protocol for Monitoring Nature-Based Shorelines

CUNY Brooklyn College
  Estimated completion: end 2019

There is a great deal of interest across New York State in the use and implementation of coastal green infrastructure (CGI) strategies for storm risk reduction. However, relatively little is known about the ability of CCI strategies to perform over time, reduce risks related to coastal hazards, and provide ecological and social benefits. Furthermore, despite the proliferdan of such strategies, there is no standardized way to compare projects of different scales, geographies, and types. This project is developing a coherent framework for monitoring and evaluating the performance of CGI projects throughout New York State's diverse coastal environment based on a strong scientific and technical foundation and with broad buy-in from agencies, practitioners, and civic groups, to support adaptive coastal management across the state.

The project is a collaborative effort with the NYS Department of State (NYSDOS).

Optimizing Biofiltration Drainage Media to Target Stormwater Pollutants

SUNY ESF
  Estimated completion: end 2021

This project will evaluate the effectiveness of different biofiltration media in managing nitrogen and phosphorous while also meeting State goals for stormwater quality management. The project will identify stormwater drainage media mixes that maintain porosity, ameliorate specific stormwater pollutants, and support plant growth. The project will perform field studies in 27 *in situ* plots, with varied medium composition and drainage characteristics. The goal is to identify mixes that can be recommended to the NYS Department of Environmental Conservation for inclusion in the NYS Storm Water Design Manual for context-specific drainage media options that provide enhanced nutrient pollutant management as well as meet stormwater management goals.